December 22, 1958

Paper Trade Journal

Extensive Reports on Developments in Cold Soda Pulping in Australia Include Plant Details and Operating Data

Screw Press Washers Used on Kraft Board Stock at Chesapeake Corp.

One of the Country's Oldest Mills Completes Major Expansion Program

1

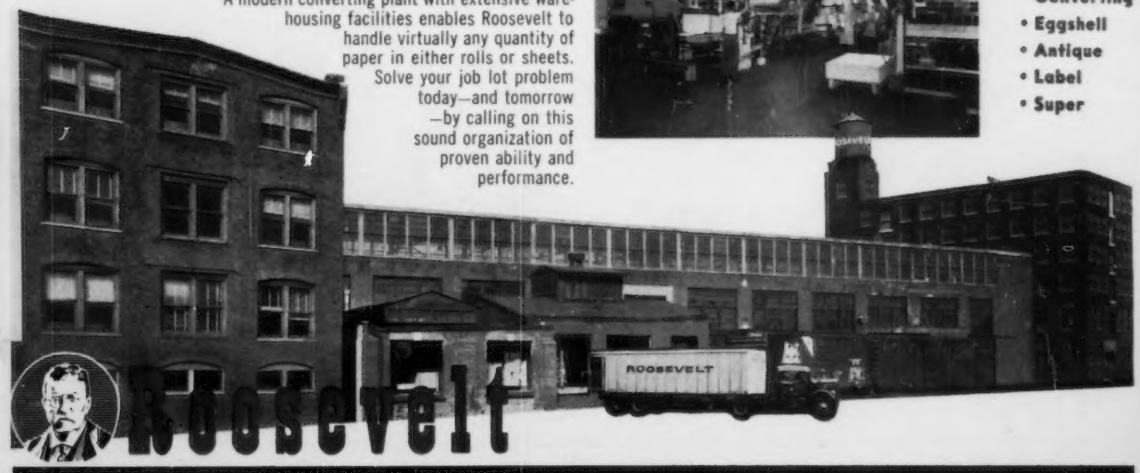
PROGRESSIVE ORGANIZATION

FOR MARKETING

ALL JOB LOTS!

- Offset
- Bond
- Enamel
- Machine Coated
- Writing
- English Finish
- Mimeo
- Index
- Bristol
- Tag
- Sulphite Converting
- Bleached Sulphate
- Envelope
- Kraft Converting
- Eggshell
- Antique
- Label
- Super

To paper mills looking for a dependable and continuous outlet for sub-standard and side-run tonnage, Roosevelt offers a strong sales organization geared to move all grades of paper to well-developed domestic and export markets. A modern converting plant with extensive warehousing facilities enables Roosevelt to handle virtually any quantity of paper in either rolls or sheets. Solve your job lot problem today—and tomorrow—by calling on this sound organization of proven ability and performance.



Roosevelt

PAPER COMPANY

ARAMINGO AND CUMBERLAND • PHILADELPHIA 25, PA.

University Microfilms
Att: E B Power
313 N First St.
Ann Arbor, Mich.

Smidth

Rotary Kilns

For Reburning Lime Sludge

We are specialists in the design and manufacture of rotary kilns, coolers and auxiliary equipment for burning lime, lime sludge and for many other purposes.

Over 1,250 Smidth rotary kilns have been furnished all over the world.

F. L. SMIDTH & CO.
Engineers and Machinery Manufacturers
11 West 42nd Street · New York, N.Y.

F. L. Smidth & Co., A/S
77 Vigerslev Alle
Copenhagen, Denmark

F. L. Smidth & Co., Ltd.
105, Piccadilly,
London, W. 1, England

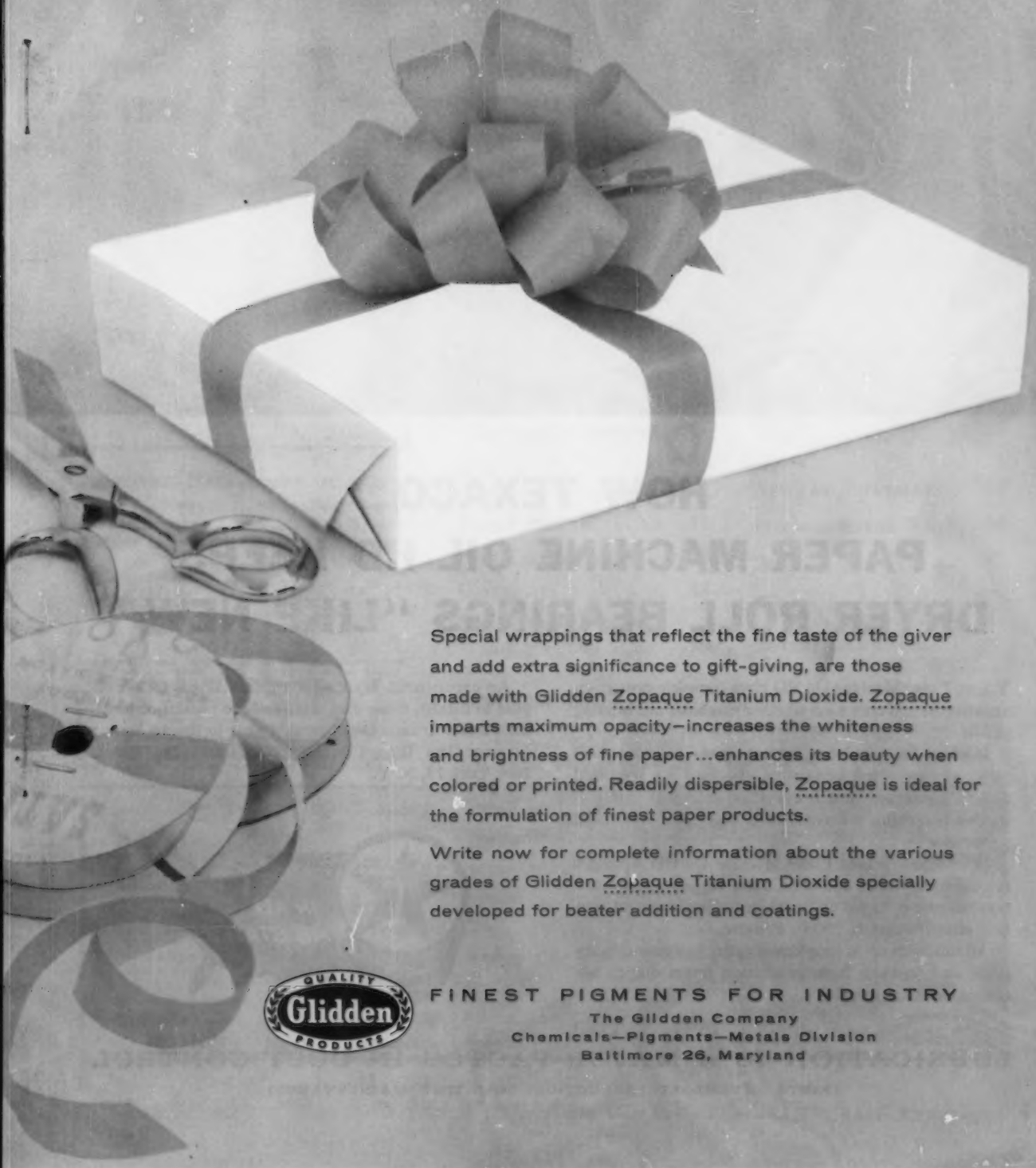
F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York, 36, N. Y.

F. L. Smidth & Co. (Bombay) Private Ltd.
42 Queen's Road
Bombay, India

FINEST GIFT WRAPPINGS...

begin with Glidden Zopaque® Titanium Dioxide



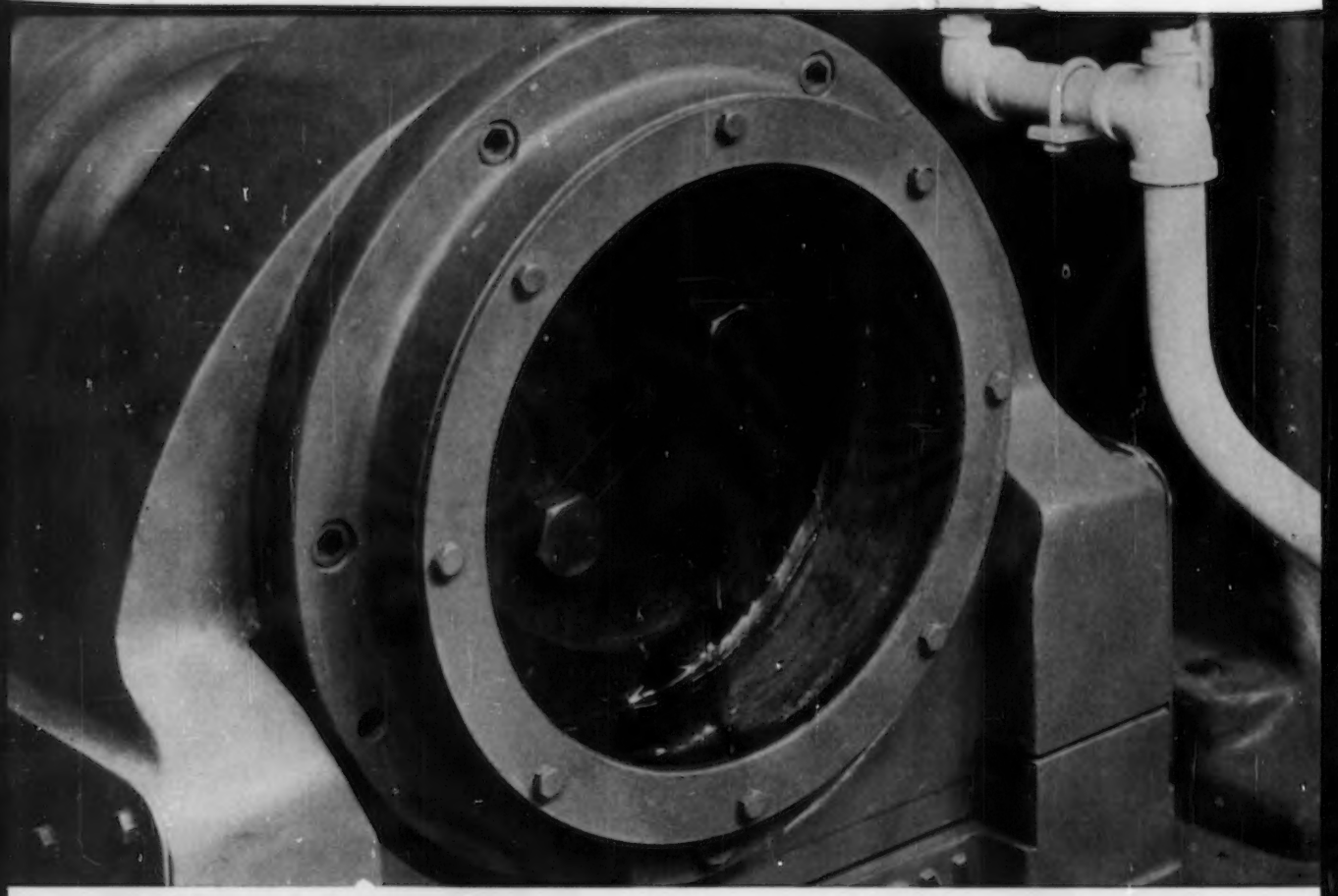
Special wrappings that reflect the fine taste of the giver and add extra significance to gift-giving, are those made with Glidden Zopaque Titanium Dioxide. Zopaque imparts maximum opacity—increases the whiteness and brightness of fine paper...enhances its beauty when colored or printed. Readily dispersible, Zopaque is ideal for the formulation of finest paper products.

Write now for complete information about the various grades of Glidden Zopaque Titanium Dioxide specially developed for beater addition and coatings.

QUALITY Glidden PRODUCTS

FINEST PIGMENTS FOR INDUSTRY

The Glidden Company
Chemicals—Pigments—Metals Division
Baltimore 26, Maryland



HOW TEXACO PAPER MACHINE OIL HD KEEPS DRYER ROLL BEARINGS "LIKE NEW"

Texaco Paper Machine Oil HD gives complete protection against rust and corrosion whether machines are running or idle.

It keeps the circulating system clean—assuring complete, uninterrupted lubrication—because it's stabilized against oxidation, and because its detergent and dispersive properties prevent carbon and paper dust from accumulating.

In addition, Texaco Paper Machine Oil HD separates readily from water, and gives extra long-lasting protection because it stands up under heavy pressure and running temperatures of 300°F. or more.

All this adds up to long bearing life, low maintenance costs, and freedom from production losses due to oil-caused machine stoppages.

An experienced Texaco Lubrication Engineer will be glad to furnish more data. Just call the nearest of more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Paper Trade Journal

PUBLISHED WEEKLY SINCE 1872

Published every Monday by Lockwood Trade Journal Co., Inc., 49 West 45th Street, New York 36

Phone: PLaza 7-2370
Cable Address: Lockmin

JOHN C. W. EVANS
Editor

PAUL D. VAN DERVEER
Associate Editor

R. E. THUEMMES
Associate Editor

V. B. HAWKINS
Managing Editor

EBEN M. WHITCOMB
Editor-in-Europe

W. N. PERRY
Staff Artist

LOCKWOOD TRADE JOURNAL CO., INC.

GEORGE E. LOCKWOOD.....President and Treasurer
ARTHUR E. GORDON.....Vice President
FREDERICK E. WINKLER.....Secretary

Entered as Second Class Matter at the post office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 North Crystal St., East Stroudsburg, Pa. Printed in U.S.A.

Copyright 1958 by Lockwood Trade Journal Co., Inc. Paper established Feb. 17, 1859, combined with Paper Trade Journal Nov. 16, 1899. Paper established Sept. 21, 1910, combined with Paper Trade Journal February 19, 1926. All rights to the above titles reserved. Contents of Paper Trade Journal, including all articles, illustrations, etc., are copyrighted and may not be reprinted except by permission. Also publishers of Lockwood's Annual Directory of the Paper and Allied Trades.

Week of December 22, 1958—*Vol. 142, No. 51*

TRENDS 7

NEWS OF THE WEEK 9

FEATURE ARTICLES

Application of Cold Soda Process to Use of Eucalypts for Newsprint 16

Manufacture of Cold Soda Pulp from Eucalypt Woods 18

Latest Data on Cold Soda Pulping at Australian Newsprint Mills 26

Why Chesapeake Uses Screw Press Washers on Kraft Board Stock 32

Hamilton Completes Major Expansion with Many Interesting Features 38

NEWS OF CONVERTERS 11

PAPER PEOPLE 14

NEW LITERATURE 44

OBITUARIES 45

NEW EQUIPMENT and SUPPLIES 46

NEWS OF SUPPLIERS .. 48

FIGURES OF THE WEEK..48

PRICES 50

CLASSIFIED ADVERTISING 52

ADVERTISERS INDEX .. 56

REMEMBER THESE DATES

Jan. 28-30, 1959: Canadian Pulp and Paper Assn. Annual Meeting, Queen Elizabeth Hotel, Montreal

Feb. 23-26, 1959: Paper Week in New York

SUBSCRIPTIONS →

Paper & Pulp Mills, Converters and their Personnel	1 yr.	2 yrs.	3 yrs.
United States	$5.00	$8.00	$10.00
Canada and U. S. Possessions	7.00	11.00	14.00

All others than above, price per year:
U. S.: $7.50—Canada and U. S. Possessions: $10.00.

Latin American Countries	15.00	25.00	30.00
All Other Countries	20.00	30.00	40.00

Single copy price of current issues:
North America 50c Foreign $1.00

R. E. BOETSCH Director of Circulation

PAPER TRADE JOURNAL—49 W. 45th St., N.Y. 36, N.Y.
Please enter a subscription with the mailing address as follows:

Name .....
Address .....
City..... Zone.... State.....
If subscription is for an individual, please fill in:
Employer..... City..... State...
Position..... Employer's Business.....
Amount $ ..... ☐ Bill Me ☐ Bill Company ☐ Check Enclosed

CHAMPION PAPERS

Another of the 25 largest paper companies using S-W facilities and abilities for the re-covering of rubber rolls.

.....ROLL SERVICE PUTS MORE PROFIT IN PAPER

STOWE-WOODWARD, INC. Griffin, Georgia • Newton Upper Falls, Mass. • Neenah, Wisconsin
On the West Coast: HUNTINGTON RUBBER MILLS, INC., Seattle 88, Washington

Trends

New Monthly Record for Paper and Board

Total paper and paperboard production in October was 2,880 thousand tons, the highest for any month in the history of the industry, according to preliminary data from the Bureau of the Census. Paper production (excl. building) in October was 1,238 thousand tons as against 1,201 thousand tons last October. Paperboard (excl. building) figures were: 1,346 thousand tons versus 1,302 thousand tons. Over-all production for the ten months of 1958 was just 0.9% below the comparable period last year. Comparing the two ten month periods paper was off 1.8%, paperboard off 0.8%, wet machine board off 3.3%, building paper and boards up 2.6%.

Pulp Production Ahead in October

Pulp production in October ran 6% ahead of same month last year and 14% ahead of September. Pulp consumption in October was 5% above October 1957. Pulp inventories at paper and board mills were at almost exactly the same level for the beginning and end of October. Inventories at pulp mills were up 6.5% at the end of October compared with end of September. Consumption of market paper pulp in October was down 7% from same month in 1957.

Folding Box Shipments Off

Folding paper box tonnage in November dipped 2% under the same month last year. Eleven month totals show tonnage off 3% and dollar volume off 2% from year ago levels.

Survey Shows Result of Wage Incentives

A nation-wide survey of 17 management consulting firms has revealed that wage incentive plans have increased productivity in 29 different industries by an average of 63.55%. The survey was conducted by George Elliott Co., Inc. The survey also shows that employee earnings in the 29 industries increased by an average of 20.6%, while the companies realized an average saving in unit labor costs of 25.91% as a result of the incentive program. The tabulations represent 2500 wage incentive installations which were made by the 17 management consulting firms. The "Papermaking and Converting" group were shown to be near the top in increased productivity.

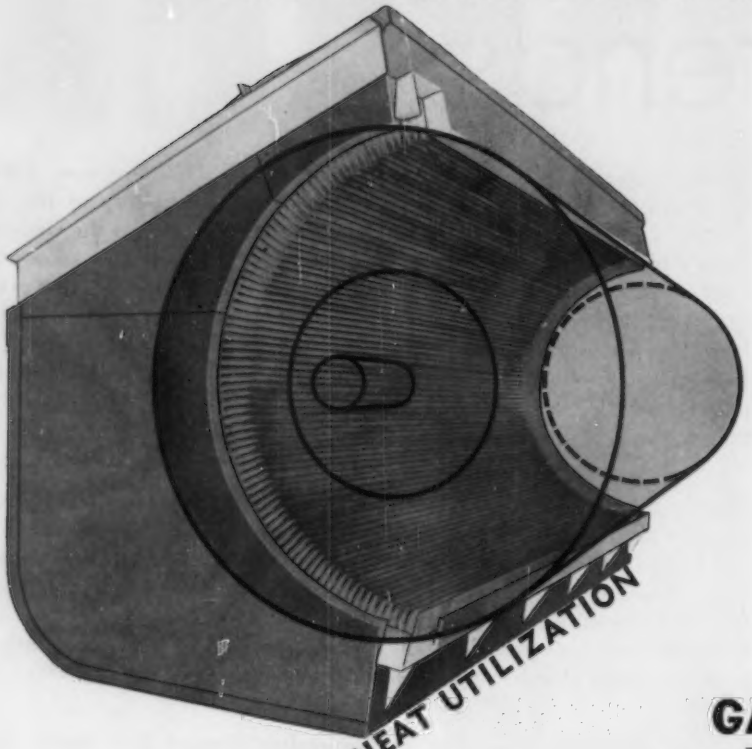
Book Paper Outlook Up

Larger advertising contracts for 1959 now accumulating at consumer magazines indicate high book paper consumption for next year.

Looking at The Economy

Industrial production and new housing starts made further gains in November—Farm Income in 1958 has been highest in many years. Crops were of record size and government support payments at a new high—Steel production has picked up in December after leveling off last month—Automobile production has finally gotten into high gear with sales improvement particularly for the so-called small cars—Increased railroad company earnings are resulting in benefits to rail equipment manufacturers. Bigger orders for freight cars and motive power units are reported.

OVER **600%** INCREASE IN DRYING RATES*



*92% EFFICIENCY IN HEAT UTILIZATION

THE
GARDNER DRYER

**Operational results from actual on and off machine coating installations*

The Gardner Dryer - - gives highest heat utilization efficiency and top drying rates through higher air velocity and controlled turbulence.

and . . . there's no damaging effect to the sheet, whether coated or uncoated.

GARDNER DRYER
RICE BARTON
OVERLY'S

RICE BARTON CORPORATION

WORCESTER, MASSACHUSETTS

Paper Machinery Builders Since 1837

Major Board and Box Producers Plan Amalgamation

American Box Board Co., Grand Rapids, Mich.; Central Fibre Products Co., Quincy, Ill.; and Ohio Boxboard Co., Rittman, Ohio, in a joint statement, announced plans to merge their companies.

The announcement said the plan for the merger, with the approval of each Company's Board of Directors, will be presented to the stockholders of each Company as soon as necessary details can be worked out.

All three companies have been eminently successful in the packaging products field in their respective areas. They are not essentially in competition with each other. The consolidation will bring together facilities producing jute and kraft linerboard, boxboard, bleached kraft, corrugating medium, molded pulp products, egg packaging products, shipping containers and folding cartons, in an area stretching from New York to Utah.

Coated and Processed Paper Ass'n Disbanding

At a special meeting of the Coated and Processed Paper Association held at the Yale Club of New York, New York City, on October 21, 1958, the following action was unanimously taken:

It was voted: That, based on changes within the Industry and resulting resignations, over which the present administration of the Association had no control, and on the unanimous recommendation of the Executive Committee, the Coated and Processed Paper Association be dissolved as of January 31, 1959.

It was voted: That the President be and hereby is authorized to appoint a committee of three, of which he shall be one member, together with the executive director-treasurer, as a member ex officio, to be known as the Dissolution Committee, to effect all the details of the said dissolution of the Association with full power to act in such manner as they determine to be in the best interests of its members.

Be it resolved that the members, officers and executive committee of the Coated and Processed Paper Association hereby express their heartfelt appreciation to Arthur Abbot Thomas for his 21 years of faithful, devoted, and efficient service as Executive Director of this association.

The services of the Association are being continued in a limited fashion on a limited budget until February 1, 1959.

New Bleaching Process for Cold Caustic Pulp

A new technique for bleaching cold caustic pulp that requires no additional bleaching equipment has been developed by Becco Chemical Division, Food Machinery and Chemical Corp. With the new process, bleaching takes place in the same equipment that is regularly used for the manufacture of cold caustic pulp. Peroxide bleach liquor is added at the refiner, and bleaching occurs during the refining operation.

Bleach response is dependent upon refiner densities. Brightness increases of up to 20 points have been obtained in commercial operations to date. The process can be applied to all typical cold caustic pulps. No additional steam costs are incurred, and the process requires no holding time reports Becco. Chemical costs are not excessive, and does not involve additional capital investment for bleaching equipment.

Std. Pkg. Completes Chemical Paper Purchase

R. Carl Chandler, board chairman of Standard Packaging Corp., New York, and Ralph H. Morrill, president of Chemical Paper Manufacturing Corp., Holyoke, Mass., announced that Standard Packaging Corp.'s acquisition of Chemical Paper Manufacturing Corp. was approved by Chemical stockholders at a meeting in Holyoke, December 15.

Chemical's assets were acquired for $2,600,000 cash. Its sales have averaged about $9,600,000 annually for the past five years with net average earnings annually after taxes of approximately $300,000 for the same period.

The company was founded in 1880 and its long established lines of rag and sulphite paper, writing paper, paper products and box board, further diversify Standard's present product group.

The company will operate as "The Chemical Fine Paper and Board Division" of Standard Packaging Corp. under the direction of Chemical's present management.

Company Employes Receive Recognition

One hundred and seventy-five years of service to Fraser Companies, Ltd., was recently marked when seven of the company's employes received engraved gold watches in recognition of their 25 years of service each with the company. Presenting the watches, Aubrey Crabtree, chairman and president of the company, congratulated and thanked each man for his long service. Those honored are shown above with Mr. Crabtree. Left to right: W. K. Scott, assistant supervisor of industrial relations; J. W. Wetmore, assistant superintendent of real estate operations; J. M. Louden, superintendent, logging equipment and repair shop; F. B. Richards, assistant controller; R. V. McCabe, accountant, accounting department; Aubrey Crabtree; D. E. Larlee, pulpwood superintendent, Restigouche division; and K. W. Matheson, assistant to the general manager.

Scholarship Available

A scholarship in the amount of $750 is offered by *Paper Trade JOURNAL* to a student who wishes to enter the University of Maine to major in pulp and paper technology. This is a continuing grant available in the freshman and sophomore years. The main purpose of the scholarship is to enable a student to major in pulp and paper at the University of Maine who might not otherwise be able to do so. Therefore the financial need of the student will have an important bearing on the choice of the recipient, who will be selected by the Freshman Scholarship Committee of the University of Maine.

Application forms for the *Paper Trade JOURNAL* scholarship should be requested from the Director of Admissions, University of Maine, Orono, Maine. Early application is advised if our readers know of such needy students they are requested to advise them of the availability of this scholarship.

Contest Winners Announced

Winners of the Pulp and Paper Industry Essay Contest have recently been announced by T. N. Beaupre, Chairman of the British Columbia Division, Canadian Pulp and Paper Association. Thirty prizes valued at $1750 plus 250 Awards of Merit consisting of wallets containing a notebook and ballpoint pencil have been sent out to the winners and runners-up.

The 1958 Competition for Junior and Senior High School students was on the subject of "What I Learned from My 1958 Facts Folder" about the Pulp and Paper Industry in British Columbia.

Nearly 14,000 applications and information folders were sent out, and from individual submissions and the best essays written during classroom exercises, 1400 essays were finally entered for judging in the competition.

New Process Combines High Wet Strength and Flame Retardancy in Light Tissue

A lightweight paper tissue that combines flame retardancy and high wet strength has been developed by Crystal Tissue Co., and is expected to find many industrial, institutional and home uses.

Classified as an eight-pound tissue, this new material, has found a unique application in the manufacture of treated top covers for disposable mattress pads used by hospitals and other institutions to minimize mattress wear. The pads consist of three layers—a top cover, an absorbent cellulose center, and a bottom layer of waterproof paper.

Many hospitals require that the top covers of the pads be flameproofed to protect against injury and damage caused by accidentally dropped cigarettes. With Crystal's new process, these top covers can be made of light tissue treated wih Du Pont's "X-12" flame retardant at a saving of 30 to 40 per cent over non-woven fiber cloth previously used. High wet strength is also incorporated to prevent the tissue from adhering to the patient's body.

K. O. Elderkin to Receive TAPPI Medal

K. O. Elderkin, president of Bowwaters Research & Development, Inc., Calhoun, Tenn. has been selected by the Executive Committee of the Technical Association of the Pulp and Paper Industry to be the 27th TAPPI Medallist.

Mr. Elderkin was born in Nova Scotia in 1895 and studied engineering at Mount Allison and McGill Universities.

K. O. Elderkin

Following graduation and a brief stay in the steel industry he entered the paper industry and was employed by such companies as St. Lawrence Corp., Price Bros., Abitibi, and Canadian International Paper Co. at Cornerbrook, Nfld. From 1939 to 1952 he was manager of the Crossett paper mills. In 1952 he became vice-president and general manager of the Bowaters Southern Paper Corp.

He was president of TAPPI in 1955 and 1956.

In announcing the award the TAPPI committee stated Mr. Elderkin's accomplishments in the field of paper mill engineering, include the design of the Allis-Chalmers stock pump (with Frank Forrest); pioneering the vacuum transfer for light-weight kraft and newsprint machines and the design of the first high speed light-weight kraft paper machine at Crossett paper mills. These machines were the first to operate at speeds in excess of 200 feet per minute. He promoted a study for nondestructive measurement of steel so that the corrosion of digesters could be studied. He initiated pioneer studies on the deterioration of southern pine pulpwood during storage which indicated that under water storage was feasible and practical from an engineering and economic standpoint. He was a pioneer in the development of the pressure headbox and promoted the building of the first Disculator for air removal in the paper machine white water system. He also promoted and developed the design of a counter roll winder using jumbo mill rolls. This machine will wind over 100 counter rolls from a mill roll with out a break even though it decelerates from over 3500 feet per minute in less than six seconds.

The presentation of the medal will be the principal feature of the annual TAPPI luncheon during Paper Week in February. The medal will be presented by G.W.E. Nicholson, president of the Tennessee River Paper Mills.

75 Exhibitors Signed for "Paper Show"

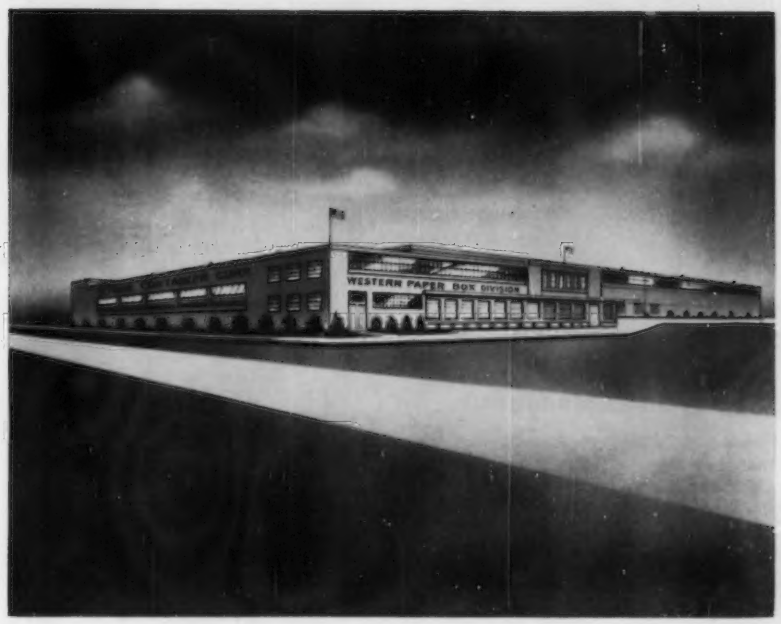
According to advice from the NPTA office the initial announcement concerning the 1959 "Paper Show" at the Waldorf-Astoria, New York, March 8 to 11, was mailed a short two weeks ago and to date 75 exhibitors of paper products and allied lines have signed up. 5 of the exhibitors will show their lines for the first time at the Show. Exhibit room numbers will be announced on January 19th, applications for space received after that date will be processed in the order of their receipt. Information about the show may be obtainted from B. J. Bonner at the National Paper Trade Assn. office, 220 East 42nd Street, New York 17, N. Y.

Paper and Board Production

According to the American Paper and Pulp Assn., the ratio of the United States production to mill capacity for the week ending December 6, 1958, was 90.3 per cent compared with 86.5 per cent revised for the preceding week. The ratio was 91.1 per cent for the corresponding week a year ago.

The paperboard production ratio for the week ending December 6, 1958, was 84 per cent compared with 88 per cent for the preceding week and 84 per cent for the corresponding week last year.

(Detailed statistics on page 48.)



New Western Paper Box Plant

New quarters for Stone Container Corp., Western Paper Box Division (a 158,000 square-foot building which used to be a Packard Motor Car Co. plant) were officially opened on December 5.

The move culminates expansion which has doubled Western's productive capacity since the operation was acquired by Stone Container in January, 1956. The division makes folding cartons, set-up boxes and corrugated containers.

In the new location the Stone unit will consolidate all operations on one floor and under one roof. The former production locations are currently retained as warehouse facilities. Space at the new location is 50 percent greater, and land is available for further plant increase said F. E. Becker, division general manager.

Expands Paper Cup Line

A Cuban manufacturer of paper containers reported that his company expects to open a new plant near here shortly to supply the Cuban market with wax-lined paper cups. They would be used for ice cream, beer and soft drinks.

Henry Fernandez Silva, president of Envases Modernos, S.A., said that at present Cuba imports about 70 per cent of its paper cup needs.

However, he added that within three or four months his firm would complete installation at a new plant on the Santiago-Majay road, near the capital, and reduce the need for these imports. Envases has been producing cylindrical cups in various sizes at a small Havana plant, but will soon be producing conical and folding containers as well at its new factory.

New Flame-Retardant Laminate Announced

A new paper-base, plastic laminate which is self-extinguishing when set afire has been introduced by Taylor Fibre Co., Norristown, Pa.

The self-extinguishing feature of the new material—called Fireban 321—is an advantage wherever a potential for fire due to electrical faults exists. In addition this material has high insulation resistance, low dielectric losses, low water absorption and good fabricating qualities.

Already successfully field-tested as terminal boards for television flyback transformer assemblies, the material should have wide use wherever flame retardance is an important consideration. It not only meets the need for an added margin of safety on XXXP Grade applications, but can in some instances substitute for melamine and silicone grades, which are considerably more expensive.

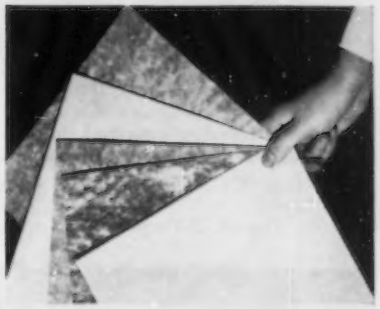
Construction Started at Western Corrugated

Western Corrugated-Los Angeles, Inc., has started construction of a 100,000-square-foot plant in the Dominguez area of Los Angeles.

The new facility, which will have a capacity of 250,000 finished cartons daily, is scheduled for completion next month. Eugene J. Nugent Jr., formerly Los Angeles representative for the company, will be manager of the new unit.

New Colored Exterior for Corrugated Boxes

In answer to the growing need among corrugated box customers for more distinctive packaging to help sell their product, Banner Fibreboard Co., Wellsburg, Va., has introduced mottled color effects. Two-Tone Bannerboard is not a printed paper, but rather a decorative effect achieved when the board is formed. While Banner has been producing colored linerboard for corrugated containers for several years, this is the firm's first two-tone product. The board is made on a cylinder machine using a strong color in the second to last vat and partially covering this with a very thin layer of white or contrasting colored stock in the last vat.



Standard two-tone colors now available include marbleized-blue, yellows, whites, reds, greens, oranges, and purples. Special two-tone color with the mottled effects also are developed when the production run justifies doing so. The company offers to create any color combination desired by a customer. The shade of colors and amount of background show-through can be varied to meet particular requirements.

Polyethylene Coated Milk Cartons

The first quart-size paper milk container with a polyethylene coating is being introduced in 25 cities this month.

Preliminary reports indicate that the

extrusion-coated cartons virtually eliminate the problem of "leakers." Additionally, the polyethylene cannot flake or rub off and is resistant to water, grease, and food acids.

Developed and produced by the Sealright Company, Inc., of Fulton, N. Y., the cartons are coated inside and out with Du Pont's "Alathon" polyethylene resin and are heat sealed at the side, top, and bottom.

O-I Moves Schmidt to N.Y.

Louis G. Schmidt, supervisor of corrugated carton operations at Owens-Illinois Glass Company's Charleston plant since 1954, has been transferred to New York.

Mr. Schmidt, who joined O-I in 1941, goes to the company's glass container sales office. He previously served two years at O-I's home office in Toledo.

Roy L. Grose Jr., of Belle, has been named district manager for state sales in the central-east region by The Carling Brewing Co., of Cleveland. Grose, a graduate of the Charleston School of Commerce, formerly worked for an insurance firm.

Three Promoted by Mengel

The Mengel Co. promoted Macon M. Dalton, district manager of the company's Louisville plant for the past three years, to the newly created position of division engineer of the corrugated box division.

James F. Tate, who has been district sales manager of the Louisville plant, will succeed Mr. Dalton as district manager.

Robert E. Guffy, who has been a salesman here, will succeed Mr. Tate as district sales manager.

In his new position Mr. Dalton will report to the manager of production and purchasing at the company's corrugated division headquarters here.

Mengel is a subsidiary of Container Corp. of America.

Gibraltar Names Einhorn Display Sales Manager

Sy E. Einhorn has been named sales manager of the Display Division of Gibraltar Corrugated Paper Co. Mr. Einhorn joined Gibraltar in April 1952 as the display division's first salesman. Previously, he had been with Flagstaff Foods in Perth Amboy, N. J., and the sales promotion department of Wheelan Studios, New York City. As senior salesman of Gibraltar's display division he has helped set up point-of-sale programs for some of the largest and most important advertisers in the country.

Taylor Fibre Promotes Lawlor

Robert M. Lawlor, for the past three years Taylor Fibre Co.'s district manager in Indianapolis, Ind., has been promoted to Philadelphia district manager.

The move returns Lawlor to the Middle Atlantic states area where he served as a Taylor sales engineer from 1950 to 1955.

Working out of Taylor's main plant and headquarters at Norristown, Pa., Lawlor will be responsible for sales of laminated plastics and vulcanized fiber throughout Delaware and Maryland, most of Virginia, southern New Jersey and Eastern Pennsylvania.

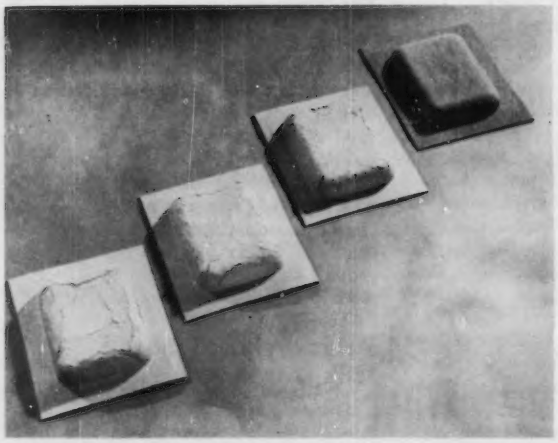
New Horizons for Kraft Paper

A wide variety of applications is envisioned for a new paper base material called X-Crepe by the manufacturer, Cincinnati Industries of Cincinnati, Ohio. The material lends itself to conventional forming processes of heat and pressure, and when combined with thermoplastic adhesives, it can stretch as much as 60 per cent in the formation of molded decorative boxes and food containers. Application of the material for such uses as automobile instrument panels, signs and displays is also foreseen.

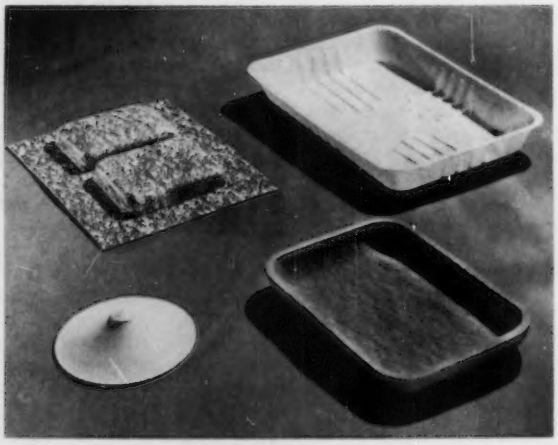
Production of X-Crepe begins with plain kraft paper which is combined with adhesive on a drum and creped diagonally. More adhesive is introduced on a second drum, and the material is then cross creped. The resulting materials range in thickness from single ply, a few thousandths of an inch thick, to multi-ply materials, a quarter of an inch thick or more that are laminated with thermoplastic resin. The addition of the plastic to the base material adds rigidity and also provides the inside or outside surface of an object such as a dish or box.

"To form objects, we have used machined steel and cast epoxy molds in our development program," says Ford Larrabee, company president. The development work indicates the forming may be done on mechanical hydraulic, or air pressure presses. Most of the work so far has been on an air pressure machine with pressures up to 350 p.s.i. Prior to forming, the material is preheated to approximately 300°F.

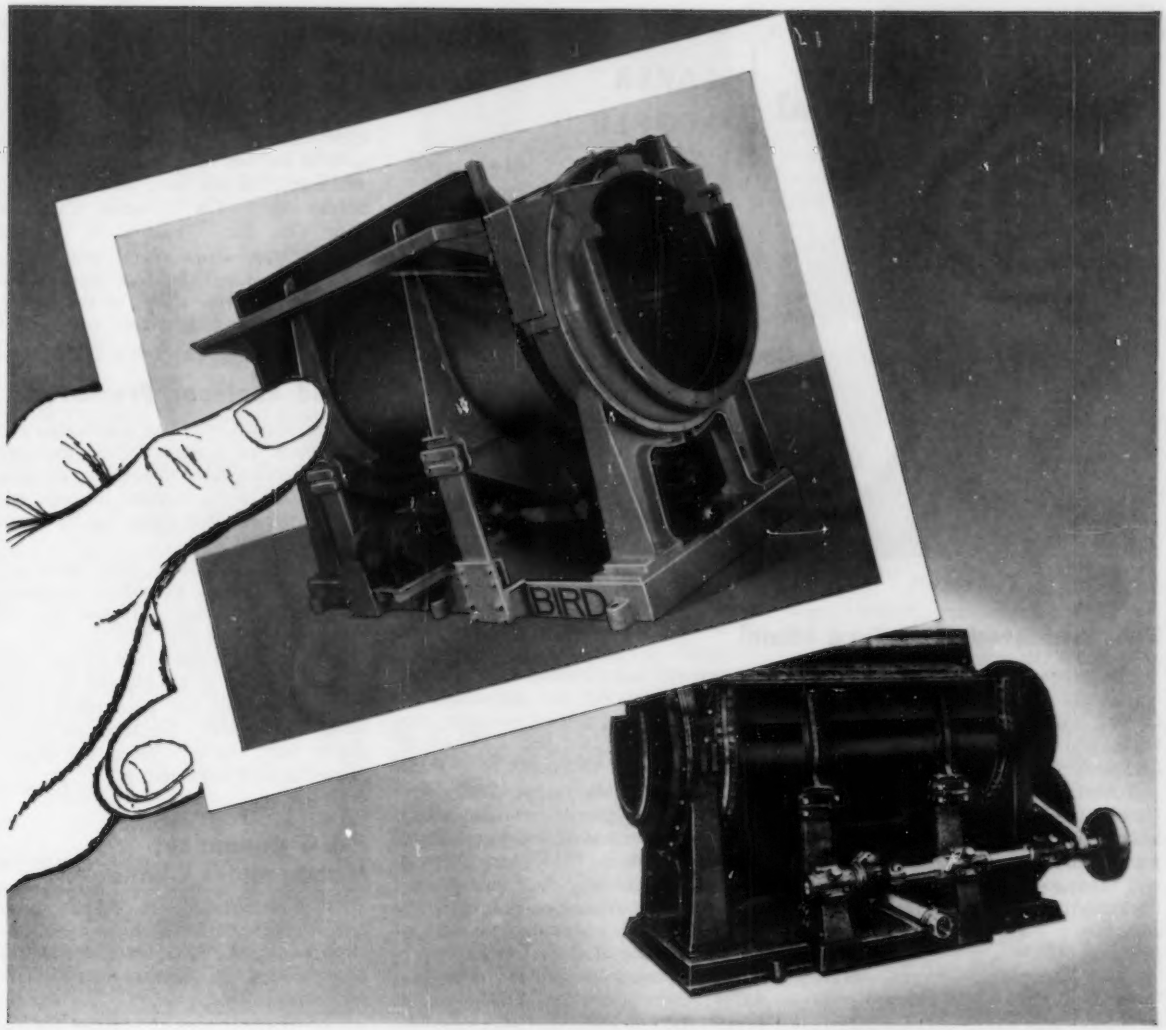
X-Crepe is used in the production of flexible air ducts for the automotive industry, as a saturating base for Formica, and for various packaging applications.



Test mouldings of standard kraft compared with x-Crepe in picture at right.



Objects indicate variety of forming applications for x-Crepe.



Time You Changed to
MODERN BIRD SCREENS?

Unless your paper machine is already equipped with *modern* Bird Screens you should find out — now — what a difference they can make in the quality and uniformity of the sheet.

Let us make a careful comparison between the old and the new, in terms of investment and return, and advise you whether or not your screen installation should be replaced to meet present demands of quality and capacity.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.

REGIONAL OFFICES: EVANSTON, ILLINOIS
PORTLAND, OREGON • ATLANTA 9, GEORGIA

Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

R. E. Beckett

J. H. Ozias

Two Promoted at Oxford Miami

The promotion of two key mill executives at Oxford Miami Division of Oxford Paper Co., West Carrollton, Ohio, was announced by Charles H. Claypool, mill manager.

Robert E. Beckett, general superintendent of the Oxford Miami Division, has been promoted to the position of paper manufacturing assistant to the mill manager. In his new capacity Mr. Beckett will work closely with the mill engineering department in design and planning. He will also function in an advisory capacity on paper manufacturing matters. Mr. Beckett joined Oxford Miami in 1915. He was machine-tender on #1 and #3 machines and in 1932 he was named night superintendent. He was named general superintendent in 1943, a position he held until his promotion last week to paper manufacturing assistant to the mill manager.

The promotion of James H. Ozias from assistant general superintendent to general superintendent of Oxford Miami Division was also announced last week.

As general superintendent Mr. Ozias will have operating and administrative responsibility and control over the production organization and facilities of Oxford Miami Division. Mr. Ozias joined Oxford Miami in 1946. After functioning as production control supervisor he was named assistant general superintendent in 1955. Mr. Ozias is first vice chairman of the Miami Valley section of the American Pulp and Paper Mill Superintendents' Ass'n., and he is a member of Ohio TAPPI.

Both promotions follow closely a series of other important changes in the organization of Oxford Miami Division. Recently B. L. Merriss was named chief engineer of the Division. He was succeeded as plant engineer by John Cavey. In other recent promotions at Oxford Miami, Harold Stevens was named superintendent of power, Richard Meyer was named finishing division superintendent and Morton Reece was named production control supervisor.

Charles I. Gordon to Retire

Charles I. Gordon, eastern sales representative for Mosinee Paper Mills Co., for the past 18 years, will retire on December 31. He has served the paper industry for more than 41 years.

When he joined the Mosinee, Wis., firm in 1940 Mr. Gordon covered 11 of the eastern seaboard states. The territory was expanded to 15 states a few years ago and his son, Stuart C. Gordon, was added to the sales staff under his father. Eastern coverage was further increased last year with the addition of W. W. Smith as a salesman.

Bex Rep for Bermico Div.

Frederick J. Bex of Atlanta, Ga., has been named southeastern sales representative of the Bermico Division of Brown Co., producers of fiber pipe and electrical conduit with mills in Berlin, N. H. and Corvallis, Ore., it was announced by Malcolm T. Murray, vice president in charge of specialty product sales.

Mr. Bex will handle sales of Bermico electrical conduits, fiber pipe for sewers and sewage disposal fields, for land and highway drainage, irrigation, and for natural gas ventilation throughout the Southeastern area of the United States. His headquarers will be in Atlanta.

Mr. Bex, a graduate of Syracuse University and its Graduate School of Business Administration, has had extensive experience in production and quality control as well as in market research and sales. He has been associated with Solvay Process Co., Syracuse, Campbell Soup Co., Inc., Camden, N. J., and for the past seven years, was Southeastern Regional Product sales manager with Carrier Corp. in the Southeastern region.

Mead Engineer Promoted

The Mead Corp. has announced the promotion of Carter Smith, engineer at the firm's Chillicothe, Ohio, division to assistant to the director of engineering for the Hurlbut Paper Co. in South Lee.

The announcement was made by George H. Pringle, executive vice president, manufacturing. Effective date of the promotion is next Jan. 1.

Mr. Smith joined Mead as an engineering trainee at Chillicothe in June, 1956, following his graduating from Rose Polytechnic Institute at Terra Haute, Ind., where he received a degree in mechanical engineering.

P & G Announces Management Changes

The board of directors of The Procter & Gamble Co. today announced the election of H. Schuyler Cole to the new position of vice president—paper products division.

The company also announced the appointment of Charles M. Fullgraf to

H. Schuyler Cole

the post of manager of the toilet goods division.

P&G president Howard Morgens said the executive changes were prompted by the increasing responsibilities involved in management of the company's paper products division making it de-

sirable for Mr. Cole to devote his full time to that division.

Mr. Cole has been vice president—toilet goods division since 1956 and, additionally, has been responsible for the management of the paper products division since early 1957. Mr. Fullgraf, has been associate manager of the toilet goods division since early 1957. Both men will report directly to the executive vice president Walter L. Lingle, Jr.

Std. Pkg. Appoints Currie Vice-President

The appointment of Derek G. Currie as vice president of Standard in charge of Eastern Division manufacturing and sales, with headquarters in Bangor, Maine. In 1957 Mr. Currie joined Eastern Corp. as vice president and assistant to the president, soon being appointed vice-president and manager of mills. He became vice-president and general manager of Eastern in 1958.

Mr. Currie joined the E. B. Eddy Co. in 1946 and became executive assistant to the vice-president and general manager in 1949. As vice-president and director, he was in charge of all production and engineering activites from 1950 to 1957. In the latter year he joined Eastern Corp.

Inlander-Steindler Names Purchasing Manager

Herbert C. Altholz, president of Inlander-Steindler Paper Co., Inc., Chicago, Ill., announced the appointment of Alvin F. Perry as purchasing manager.

A. F. Perry

Mr. Perry, a resident of Arlington Heights, Ill., joined the company in 1955, and has served as comptroller since 1957.

The company, founded in 1887, in addition to Chicago and Kankakee Ill. operations, has offices in Hammond,

George Knight

whose appointment as director of research, Oxford Paper Co., was announced recently.

South Bend, Grand Rapids, Detroit, Milwaukee and Cleveland.

In announcing Mr. Perry's appointment, Mr. Altholz emphasized the important role the purchasing executive has in our economy, stating that its place is only rivalled by the American Salesman.

G. J. Miller Personnel Director of Institute

Gowan J. Miller has been appointed to the newly created position of personnel director of The Institute of Paper Chemistry.

He is a graduate of the College of St. Thomas and has completed two years of graduate study at the University of Minnesota. Mr. Miller comes to the Institute from the Automatic Control Co., St. Paul, Minnesota and earlier was associated with Remington - Rand Univac.

Founder of Sutherland Steps Down

Louis W. Sutherland, 75, has stepped down as board chairman of Sutherland Paper Co., which he and a brother, Fred, founded in 1917 with $10,000 capital.

The company now is a multi-million dollar enterprise employing 3,000 persons.

William Race was elevated from president to succeed Mr. Sutherland as board chairman, and E. Wendell Smith was promoted from secretary-treasurer to president. Mr. Sutherland remains a director and chairman of the board's executive committee.

Continental Can Appoints C. H. Day Manager

Charles H. Day has been appointed manager of manufacturing for the Paper Container Division of Continental Can Co., it was announced by E. R. Van Meter, Division vice president.

Formerly general manager, south-central district of Continental's Central Metal Division, Mr. Day will have his new headquarters at the Paper Container Division office in Newark, New Jersey. He replaces George H. Barker who has been named manager of Paper Container's new plant in Three Rivers, Mich.

George S. Johnston, Jr., previous manager of the Three Rivers plant, has been transferred to the Robert Gair Paper Products Group of Continental Can as manager of bleached paper development. His headquarters will be in New York City.

Paine Joins St. Croix

Lewis B. Paine has joined the St. Croix Paper Co., as a project engineer Mr. Lewis received his Bachelor of Science degree in Mechanical Engineering at the University of Maine. He was formerly associated with the Worthington Corp., as a research engineer and with the Eastern Corp.

Champion Appoints Special Assistant

The Champion Paper and Fibre Co., Hamilton, O., has announced the appointment of Maj. Gen. Alfred H. Johnson, U.S.A.F., Ret., as special assistant to Henry W. Rigby, executive vice president, corporate development.

Maj. Gen. Alfred H. Johnson

A 1926 graduate of the U. S. Military Academy, he served continuously in the U. S. Air Force until his retirement from active service in 1957. Most of his service was in the industrial and business phase of armed force's activities, working on production, engineering, procurement and administrative problems.

Developments in Cold Soda Pulping in Australia

Application of Cold Soda Process to Use of Eucalypts for Newsprint

J. L. Somerville, Chief Chemist, and **A. J. Pearson,** Senior Research Chemist,
Australian Newsprint Mills

A SUMMARY

Pulping of wood from a eucalypt forest consisting chiefly of old and regrowth trees of Eucalyptus regnans F. Muell., E. obliqua L'Herit., and E. gigantea Hook. f., by the cold soda process were investigated in the laboratory and on the mill scale. Pulp, relatively uncontaminated by iron, was made in a laboratory Bauer refiner and the strength and brightness determined after refining the pulp to a freeness within the range 100 or 200 C.s.f. The preferred chip size was found to be ½ in. giving a high rate of soda penetration and pulp strength approaching a maximum. Pulp from chips in the green state gave the same strength as that from air dried chips. The effects on strength and brightness of the amount of soda absorbed by the chip in a batchwise soaking stage of two hours, the freeness of refined pulp and the temperature of soaking were determined for a range of wood qualities. Higher soaking temperatures up to 60°C. gave stronger, but duller pulps. The presence of polyphenols in the woods examined caused the spent liquors from the cold soda pulps to be much darker than those from similar pulps from aspen. Recycling spent soaking liquor and holding the chips for three hours after soaking lowered the pulp brightness by several units, while the effect on strength was minor. This effect of holding chips after soaking can be reduced by spraying them with washer filtrate. By washing the pulp part way through the refining process the washing may be done at a higher freeness. Consequent decrease in pH of the pulp did not affect the strength at the same final freeness. The opacity of these cold soda pulps is much lower than that of eucalypt groundwood; the brightness of mixtures of 20 per cent cold soda pulp and 80 per cent groundwood is only slightly different from that of the groundwood.

Soaking Green and Dry Chips

Experimental work showed no difference in rate of absorption of alkali or in strength of pulp produced when the moisture free content of the chip was varied from 94 per cent to 53 per cent with a constant soaking time of 2 hours.

Freeness Reduction versus Strength

Reduction in freeness of cold soda pulp is characterized by increase in burst factor, tear factor, breaking length, drainage time and wet-tensile strength, with decrease in bulk. When the final strength attained is low the rate of increase in burst factor, tear factor and breaking length is constant and the wood is of poor pulping quality. With good quality pulping woods the rate of increase in strength with decrease in freeness increases rapidly as the freeness falls below 150. The drainage time of cold soda pulps as the freeness falls to 100 reaches the value of the slower draining groundwoods used in the mill.

The rate of absorption of sodium hydroxide varies considerably between different classes of pulpwood.

Chip Size versus Strength

Soaking time is excessively long with the 0.85 in. chips, while some decrease in strength properties is noticed with the shorter chips. This strength decrease may be associated with the short soaking time or perhaps with artificial reduction in freeness by increase in the number of fibres cut during chipping.

Soaking Temperatures versus Strength

The soaking process is slightly exothermic and in a batch process on the large scale, heat would be stored in the spent liquor. This liquor would be recycled to conserve available caustic soda so that the soaking temperature would tend to rise.

The temperature of soaking has considerable influence on the strength of cold soda pulps at constant alkali absorption. The rate of absorption of sodium hydroxide from solution increases with increasing temperature, thus as the temperature of the soak is increased the strength of the soaking liquor must be decreased for constant alkali absorption. With increase in soaking temperature burst factor, tear factor and breaking length increase, and bulk decreases. This rise is most marked between 10°C. and 30°C., the subsequent rise being slow. Increase in the temperature of soaking increases also the

About this Presentation

We present here an extensive report on cold soda pulping at Australian Newsprint Mills. This consists of the full text of a paper published in APPITA magazine for November 1958, describing the cold soda plant in detail; a summary of a second paper from the same magazine, which reports research done on cold soda pulping there; and finally a short article specially written for Paper Trade Journal which presents recent changes, operating data and the cost of the project. Presentation of the two papers from APPITA magazine is by special financial arrangement with the publishers, Australian Pulp and Paper Industry Technical Ass'n. Complete text of the research paper which is only summarized here, combined with the second paper and the text of the discussion which followed the presentation of these papers is available as a reprint from the Association at 476 Collins Street, Melbourne C1, Victoria for 15 shillings each.

effect of freeness reduction on strength. Thus larger increases in burst factor, breaking length and particularly tear factor can be obtained by reducing the freeness from 200 to 150 when the temperature of the soak was 40°C. than when it was 20°C.

The brightness is decreased by increase in soaking temperature. The brightening by zinc hydrosulphite is lower when the soaking temperature is high. The pulp becomes brown and is more difficult to brighten. Thus, for newsprint manufacture, a compromise must be achieved between maximum brightness and increased strength if the soaking temperature is to be regulated. The opacity, drainage time at constant freeness and wet-web strength were unchanged by increase in soaking temperature.

Effect of Standing of Soaked Chips

Chips, soaked and drained by a batch process must be left standing for a length of time that varies with the size of the batch soaked and the pulping rate. The strength properties are affected by both time and temperature of standing. The effect of time of standing is to increase the strength properties of the pulp at constant freeness. A maximum is reached in a time dependent on the amount of sodium hydroxide absorbed. When the charge of alkali absorbed is low, maximum strength is reached in from three to six hours but if the amount of alkali absorbed is high, maximum strength is reached in three hours. The brightness continues to decrease with time of standing and a minimum is not reached in 24 hours.

The temperature of the soaked chips has been found to rise, following draining, indicating that some chemical reaction is continuing to take place.

Effect of Recycling Spent Liquor

During soaking, chips of typical quality absorbed approximately 60 per cent of the sodium hydroxide applied. In practice it would be necessary to recycle this spent liquor for further soaks. Spent liquors that had been recycled twelve times caused a slight decrease in the rate of absorption of sodium hydroxide by chips but at constant alkali absorption no change in any strength property could be determined. Some decrease in brightness occurred.

Effect of Washing and pH

During the cold soda process, washing of the stock could take place after preliminary breakdown of the chip or after final refining, but the cost of such washing would be higher if done at low freeness.

The stock can be washed at any stage in the process without effect on strength and thus, refining at a high pH does not hasten the development of strength. Washing the pulp after refining, adjustment of the pH to 7 or to pH 4 with sulphuric acid had no effect on strength properties.

Brightness of Pulp

The brightness of cold soda pulps is greatly affected by the coloring of the original wood. Regrowth timbers give pulps with high brightness while dark old-growth timbers give pulps with low brightness.

Bleaching and Brightening

Cold soda pulp prepared from the eucalypts can be bleached or brightened by the usual methods employing hydrosulphites, peroxides or hypochlorites.

Brightening and Hydrosulphites

Treatment with 0.5 per cent zinc hydrosulphite at 50°C. and three per cent stock concentration for two hours at a pH above 5 followed by acid washing at pH 2.6 increases the brightness of cold soda pulp by approximately 9 units B. Treatments at lower temperatures are not as effective.

The presence of iron in the pulp causes serious loss in brightness with this process unless the pulp is washed with mineral acid after brightening.

Brightening with Hypochlorite

Increases of 8.5 units B with five per cent available chlorine and 14 units B with 7.5 per cent available chlorine were obtained during treatments with calcium hypochlorite under alkaline conditions. At three per cent stock concentration and at room temperature the time for such a treatment is less than an hour. A pretreatment with one per cent sodium hydroxide did not increase the effectiveness of the hypochlorite bleach.

Brightening with Peroxides

A treatment with 0.5 per cent hydrogen peroxide in the presence of 5 per cent sodium silicate and 0.5 per cent magnesium sulphate at 50°C. and 15 per cent stock concentration increased the brightness 15 units B. The time of the treatment was 3 hours. A pre-treatment with 1.5 per cent sulphuric acid had no effect on the brightness after bleaching.

Blending Cold Soda Pulp with Groundwood

Brightness

Cold soda pulps from the eucalypts have opacity of 87 to 92 per cent compared with 97 to 99 per cent for eucalypt groundwood. On blending the brightness of the less opaque pulp is always masked by that of the more opaque pulp. Provided the brightness of the cold soda pulp is not too far below that of the groundwood, it has little influence on the final brightness of the furnish.

Strength

Replacement of part of the groundwood component of a newsprint furnish by cold soda pulp increases the strength properties. With blends of cold soda pulp with groundwood and kraft pulps, the values obtained for burst factor and tensile strength are lower and tear factor higher than those obtained by calculation from the strength of the components using the simple mixing law. However, the replacement of 25 per cent of the groundwood by cold soda pulp of average strength increases the burst factor of the newsprint mixed stock by two units, the tear factor by six units and results in decrease in both bulk and Gartshore drainage time.

References to Literature

(1) Somerville, J. L. and Burkitt, J. S.—*Aust. Pulp Paper Ind. Tech. Assoc. Proc.* 5: 146 (1951).
(2) Brown, K. J. and McGovern, J. N.—*TAPPI* 33(8) :364 (1950).
(3) Brown, K. J.—*TAPPI* 35(12): 110A (1952).
(4) Brown, K. J. and McGovern, J. N.—*Paper Ind.* 35(1): 66 (1953).
(5) Woodhead, R.—Australian Patent Specif. No. 17, 342/34 (1934).
(6) Chidester, G. H. and Brown, K. J.—Forest Products Lab., Madison, Report No. 2013 (1954).
(7) Chidester, G. H.—Forest Products Lab., Madison. Report No. 2027 (1955).
(8) Brown, K. J. and Monsson, W. H.—*TAPPI* 39(8): 592 (1956).
(9) Brown, K. J. and Hilton, R. D.—*Paper Trade J.* 140(21): 42 (1956).
(10) Eberhardt, L.—*Paper Trade J.* 140 (8): 30 (1956).
(11) Snyder, K. L. and Premo, R. A.—*TAPPI* 40(2): 40A (1957).
(12) Dunning, J. W. and Converse, C. W.—*Paper Mill News* 80(12): 68 (1957).
(13) Colombo, P., Corbetta, D., Gaetani, L., Pirotta, A. and Sartori, A.—*Bull. Assoc. Tech. Ind. Papetiere* No. 3: 61 (1956).
(14) Bugg, E. J. and Pearson, A. J.—*APPITA J.* 12(3): 73 (1958).
(15) Second Report Pulp Evaluation Committee, Paper Mak. Assoc. Tech. Sec. (1936).
(16) Provan, D., Scorgie, R. and Harrison, H. Ainsworth.—*Paper Mak. Assoc. Tech. Sec. Proc.* 28(1): 253 (1947).
(17) Gartshore, J. L.—*Paper Mak. Assoc. Tech. Sec. Proc.* 16(1): 119 (1935).
(18) Brecht, W. and Heinger, M.—*Textil-Rundschau* 2(1): 15 (1947).
(19) Neale, F. R.—*Aust. Pulp Paper Ind. Tech. Assoc. Proc.* 4: 97 (1950).
(20) Neale, F. R., Pearson, A. J., and Somerville, J. L.—*Aust. Pulp Paper Ind. Tech. Assoc. Proc.* 4: 134 (1950).

Second in a series of Three Articles from Australia

Manufacture of Cold Soda Pulp From Eucalypt Woods

E. J. Bugg, and **A. J. Pearson,**
Pulp Mill Supt., Senior Research Chemist,
Australian Newsprint Mills

A report on pioneering work on the production of groundwood type pulp for newsprint using hardwood chips and a mild cold caustic treatment without pressure.

The first cold soda pulp produced in Australia on a mill scale was made at Boyer late in July 1957, and within three days of plant start-up, this pulp became part of the newsprint furnish. The plant has operated continuously, producing 30 tons of cold soda pulp each day, all of which has entered the mixed stock supply to two newsprint machines in a controlled proportion. The pulp has in every way met design specifications for strength properties and energy requirement. An outline is given in this paper of the conditions adopted for the cold soda process in the plant and of the principle, control and operation of the mechanical units used in the process. Typical results for strength properties and refining energy are given for a number of wood species and the performance of the pulp in the newsprint furnish is briefly discussed.

A plant for the production of cold soda pulp has been built by Australian Newsprint Mills Ltd. at Boyer, Tasmania. The first section of this plant was designed by the engineering staff of Australian Newsprint Mills Ltd. and was based on results obtained by the research and development division in adaptation of the cold soda process for the use of eucalypts in the manufacture of newsprint. The plant was to produce 30 oven-dry long tons a day of pulp at 150 Canadian standard freeness from mixed eucalypt species. The plant was designed to treat ½ to ⅝ in. chips at 86°F. with a sodium hydroxide solution of sufficient strength to absorb six per cent sodium hydroxide on the oven-dry chip weight. The liquor to oven-dry wood ratio was to be 5 to 1 when the moisture in the chip was included. Subsequent refining in single rotating disk refiners was to reduce the soaked chip to a pulp at 150 freeness with a burst factor of 18 and a tear factor of 45 with an estimated energy usage of 55 to 62 hp. dy. per long ton of fiber. The first pulp produced was made late in July, 1957, and since then the plant has been in continuous operation producing pulp for inclusion in the newsprint furnish.

(Note: Figures in this article refer to a "long" ton which is 2200 pounds.

The editors are particularly pleased to be able to report on this Australian installation for manufacture of a groundwood type pulp from hardwoods since they have been unable to obtain any information on the two installations of this process at American newsprint mills. The Australian cold soda plant has been in commercial operation for a year and a half and has been expanded and improved during this period. Australian Newsprint Mills has been most generous in providing operating details and data even though the company indicates that all phases of the operation are not established, e.g. the screw press is not yet in use.

Process Flow

After chipping, green chips are stored in a three compartment chip bin, to be drawn in batches for treatment in the cold state with a solution of caustic soda. Chips are withdrawn by a variable-speed, twin-screw feeder, and elevated, conveyed and weighed before passing through a chip spreader to the rotary globe soaker. Here a prepared solution of caustic soda is added and the charge allowed to stand in this state for two hours before the liquor is drained away and the chips dumped into a soaked chip bin.

The soaked chips are removed from the bin by a table feeder, and passed by conveyor and elevator to a screw conveyor which supplies the screw presses, returning excess feed to the

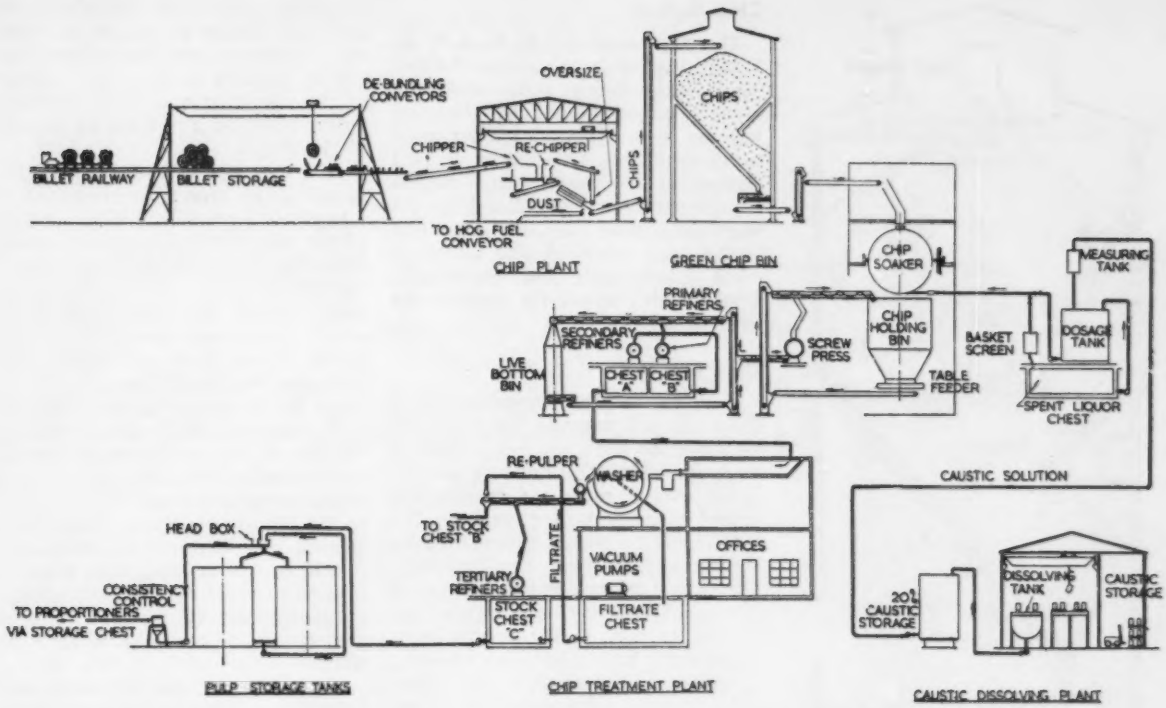


Fig. 1—Flow sheet for cold soda process used at Australian newsprint mills in Boyer.

soaked chip bin. After pressing, the expressed liquor discharges to sewer and the defibered chips enter the primary refiner circuit in which a live bottom bin provides a buffer storage of pressed chips.

The primary refiner feed is regulated through a uniflow feeder, and the product passes into a stock chest from which it is pumped through a rotaflow feed controller into the second stage refiner; excess feed returns to the primary stock chest. A secondary storage chest is situated under the second stage refiner and from here the product is pumped through a fine screen to the vacuum washer. From the washer it is screw conveyed to the third stage refiner, excess feed returning to the secondary stock chest. After third stage refining the product is ready for addition to the furnish and is transferred through a stock concentration regulator to a tank storage.

Chipping Plant

Design, construction and erection of the chip preparation as well as the chip treatment sections of the cold soda plant were carried out completely by Australian Newsprint Mills Ltd. engineering staff and in the design and layout of both sections many original ideas were incorporated to meet local needs and the first of those related to the handling of billets.

Billet Handling

Provision has been made to handle cord wood in four foot lengths in bundle form, each bundle weighing approximately 1700 lb. oven-dry. Delivery may be made from the internal rail system direct from band or splinter mills and yard storage, or from rail or road. Bundles handled by a four ton gantry crane are positioned in a set of air operated debundling arms which clamp the bundle while the sling is being removed, then lower it on to the first of a set of three speed-up link conveyors (Figure 2).

The conveyors are unit controlled and driven through a variable speed hydraulic motor. The increasing speed of each section and a drop of six inches from one conveyor to the next, separates the bundle into a single layer of billets which then drop into the conveyor to the chipper. The chipper is protected by an electronic metal detector which is electrically interlocked with the conveyor drive.

Chipper

The chip plant was designed for a maximum output of 28 long tons green chips/hr., but the chipper installed, a 66 inch Norman will exceed this rate. The chipper which is mounted on an independent foundation block is driven at 570 rev./min. by a 300 hp. motor and each of its 16 knives, 18 by 3¾ by 3⅜ inches are helically ground, and set to cut a ⅝ inch chip. The feed throat was designed to give clearance to a square billet 7 inches in cross section.

A high level electronic probe in the receiving hopper beneath the chipper relays a signal to the feeding attendant. The hopper has an adjustable discharge gate which is set according to the capacity of the star feeder and/or chip screen.

To date we have used mostly Simonds

Fig. 2—De-bundling conveyor system.

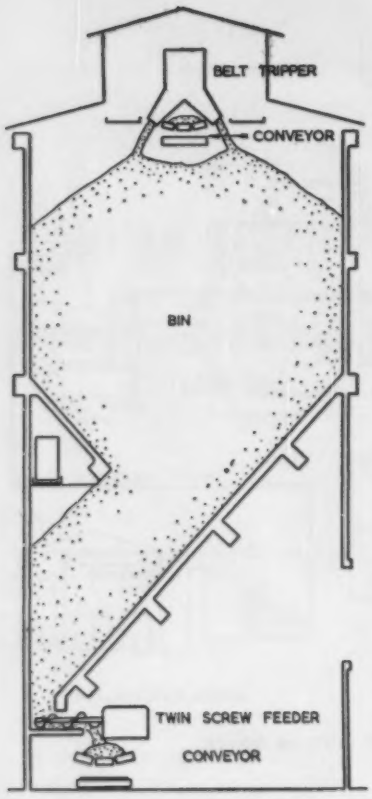


Fig. 3—Chip storage bin.

knives with a Rockwell hardness of 55 to 57. These knives, changed every six hours, chip on the average, 100 bundles. It is felt that surface moisture of the wood plays an important part in knife capacity, the life of which is governed by a sticky deposit on the knife surface rather than the blunting of the knife. Throughputs as high as 160 bundles per knife change have been made when chipping freshly milled billets while a figure as low as 30 bundles has resulted for billets that have been in yard storage for three weeks.

Chip Screen

The chip screen (10 ft. by 4 ft. by 5 in.) supplied by Canadian Sumner has a reciprocating shake separating oversize, accept and pin dust. Oversize and pin dust combined are no more than one per cent. Oversize is rechipped through an 8 blade 36 inch Canadian Sumner rechipper. Pin dust joins the hog fuel passing from the band mill to the steam plant. A chip sample is taken automatically and continuously from the chip screen for moisture determination.

Chip Bins

Each of the three compartments of the reinforced concrete bin holds 145 tons of green chips and has a common discharge table. Transformers and the motor control room are conveniently housed under the sloping bin floor. We have found this bin convenient for storing three chip types simultaneously. The only disadvantage encountered to date is the tendency for a certain type of chip to arch at the narrow point opposite the baffle piece, this tendency is greatest with wet chips from overmature species. One compartment has been sodium silicate coated to assist chip flow, but this has not prevented arching which is now being broken up by heavy chains suspended on blocks from above. Chips are withdrawn by a twin screw feeder.

All units in the chip plant from the chip feeder conveyor to the chip distributor conveyor at the top of the green chip bin are electrically interlocked and can only be started in the sequence of last unit in the plant being started first and so on. In the event of any unit cutting out or being stopped, all those preceding it in the circuit automatically stop with it, while those following continue to operate.

Caustic Soda Dissolving

The caustic dissolving method is in principle the same as that used by the Australian Aluminum Commission at Bell Bay. Drums of caustic soda with the lids removed are inverted over dissolving jets and sit on a grid on top of the dissolving vat. The dissolving liquor in the vat is recirculated through the jet line.

In all, six tons of caustic soda, contained in 16 drums, are dissolved at a time and a solution of approximately 23 per cent NaOH by weight is made. Dissolving is done inside a closed building and there has been no need to exhaust vapours. The temperature of the caustic liquor rises to 140°F. at completion. Many drums are empty inside 3 hr., but the circulating pump is run for 4 hr. to ensure that all solids are fully dissolved. After transferring the solution to the strong caustic storage by by-passing the dissolving line, part of the water for the next batch is added to the vat, the circulating pump is restarted, and all drums are thoroughly flushed before removing them from the deck. The whole operation of opening, positioning and dissolving, etc., is done comfortably by one man in an 8 hr. shift.

As the water volume and caustic soda weight are constant for each batch, strength tests are dispensed with and strong caustic solution is taken as 256 lb. NaOH/100 gal. when preparing soaking liquors. This solution is held in two storage tanks which have a total capacity of 7800 gal.

Chip Treatment Plant

The plant which was designed for an output of 72 long tons o.d. of cold soda pulp per day was built to house the following equipment: one rotary globe soaker, two screw presses, six refiners, one washer, and two fine screens. Initially, only one rotary globe soaker, one screw press (Anderson), three refiners (Sprout Waldron), one Oliver vacuum washer, and one fine screen were installed for a rated output of 24 long tons o.d./day plus. An order has been placed for three additional Sprout Waldron refiners, and these are expected to be brought into operation in October, 1958.

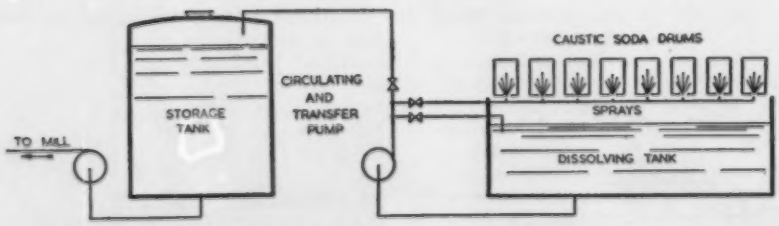


Fig. 4—Caustic dissolving plant.

Rotary Globe Soaker

This type of soaker was chosen for its simplicity of operation and ease of discharge. It was designed and made by Thompsons of Castlemaine with details as follows: Material 1 in. mild steel plate, diameter 17 ft. 6 in., door opening 2 ft. 3 in., full weight 93 ton, empty weight 21 ton, maximum pressure 100 lb./sq. in. and maximum vacuum 28 in. Hg. The normal chip charge is 12.35 long ton o.d. The

soaker is supported on two trunnion bearings and is driven forward or reverse through "crawl" and "run" with maximum speed of 0.5 rev./min. by an electric motor and gear drive, the principal gear is 9 ft. 6 in. in diameter. Chip charging and discharging are made through the door opening which is uncovered at all times, while liquor charge and drainage are via a six inch "fill" and "drain" line which enters the bottom of the soaker under a mushroom drainer.

Chip Charging

The green chip charge is brought from the twin screw feeder to the soaker by way of conveyor, bucket elevator and conveyor where it is weighed by a weightometer before being distributed inside the globe by a chip spreader. The chip charge system is interlocked so that no unit will operate unless the chip spreader is in position and this unit must be running before each one in turn back to the twin screw feeder can be started. Additional safety interlocks are provided in the soaker drive so that it cannot be rotated while the chip spreader is positioned or the drain and fill line is connected.

Liquor Charge

The liquor ratio found necessary in the plant is 5.1 gal. liquor to 10 lb. o.d. chip, and the liquor charge is made up of spent liquor from the previous soak, moisture in the green chip, make up strong caustic solution, and filtrate from the washing process. Strong caustic soda is pumped from storage to a 1400 gal. graduated measuring tank and gravitates to the 14,600 gal. liquor charge tank. In the liquor charge tank, all components of the charge are circulated to blend, and at approximately 86°F. it is pumped into the soaker simultaneously with the charging of green chips. At present we prepare 10 ton o.d. soaks and the whole operation of charging chips and liquor takes approximately 20 min.

Spent Liquor

After a two hour soak period, the liquor is drained by gravity to the 39,000 gal. spent liquor chest. During drainage, which occupies approximately 25 min., a sample is taken for evaluation of free caustic soda. The normal caustic content is 6 to 7 lb. per 100 gal.

Soaked Chip Bin

Following the drainage of spent liquor, the soaker is inverted and the chips dumped into the soaked chip bin. To completely remove the chip charges it is necessary to reverse the soaker to and fro several times and the time taken to do this is approximately 20 min. The soaked chip bin is constructed of mild steel and lined with stainless steel. All metal surfaces in contact with chips or stock from the soaked chip onwards throughout the plant are of stainless steel. A conventional table feeder forms the bottom of the bin and transfers the chips to the conveyor leading to the presses and/or refiners. The conveyor is electrically interlocked with an electric metal detector.

Press

The press is an S. W. Anderson "Super Duo" heavy duty two stage fiberpress, with a heavy duty integral water cooled horizontal shaft with stellite facing. The feed screw, hopper and all splash guards and covers are of type 304 stainless steel, the drain trough is metallized inside with a 0.015 to 0.018 in. type 316 stainless steel while all barrel rings, clamping bars, pressure bars and keeper knife bars are chemically plated with 0.003 in. alcoplate containing 93 per cent nickel. As supplied, the machine was provided with gears for speeds of 185 rev./min. and 252 rev./min. in the vertical barrel and 92 rev./min. and 121 rev./min. in the horizontal barrel. Work to date indicates that the optimum combination of shaft speeds for eucalypt does not lie in this range and the machine has been taken out of the circuit temporarily, to modify the speed ratios and to install a specially designed vertical shaft thought to be better suited to local operating conditions.

Refiners

The refiners are Sprout Waldon 36-2 single rotating disk models fitted with 500 hp. synchronous motors giving a speed of 1000 rev./min. All parts in contact with pulp or process liquors are of type 304 stainless steel. Three refiners are installed and the circuit is arranged for both two and three stage refining. The refiners are fed through "bent-leg" chutes fitted with electro magnets to prevent iron trash from entering the refiner.

Only three stage refining has been used as soaked chips have had to be fed to the primary refiner. When screw-press product is available it may be possible to use two stage refining. The soaked chips at 40 per cent consistency are fed to the primary unit through a uniflow feeder, receiving direct from an overhead screw conveyor with excess returning through a live bottom bin. Uniflow feeding is ideal for our product and is recommended for concentrations outside the scope of pumps. Similar uniflow feeding is adopted at the third stage refiner where the repulped washer cake is screw conveyed directly to it. Here the feed is not as positive as it is in the first stage where the live bottom bin forms a buffer, and its regularity is entirely dependent upon uniform washer discharge. The washer is usually run with a feed approximately 25 per cent in excess of the third stage refining needs, the excess being returned to the second stage storage. Feed to the second stage is pumped through a line which discharges excess stock back to the first stage storage chest. Entry to the refiner is through a Rotaflow feeder and throat screw feeder.

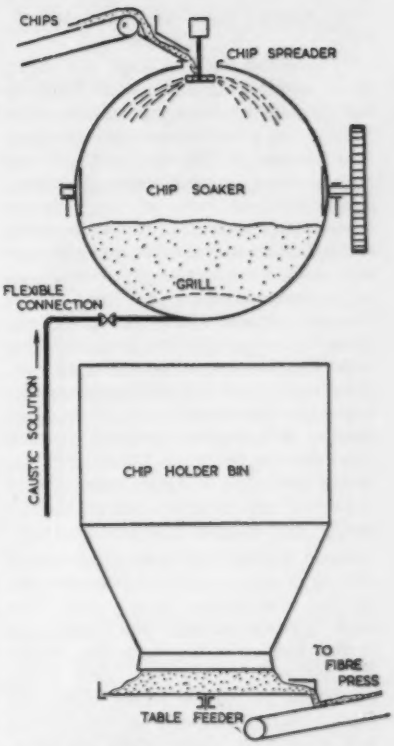


Fig. 5—Spherical soaker and chip holding bin.

Operation of Refiners

Before putting on load the relative positions of the refiner plates and peripheral control rings are established and the micrometer gauges zeroed accordingly. After this initial zero setting, it has been found unnecessary to repeat it as the load and nature of the product indicate their position.

The established optimum freeness to suit paper machine running is 150 C.s.f. The first and second stage refiners are operated at full motor load and the third stage at the load required to give this freeness. Experience has shown that

the freeness of stock from the second stage must not exceed 520 C.s.f. if it is to be held to 150 C.s.f. at the third stage without a reduction in throughput.

Throughout the first stage, the object is to combine refining with breaking and here the physical appearance of the pulp is the guide rather than its freeness because at 750 to 780 C.s.f., the normal range in this stage, the maximum drainage rate of the freeness tester is approached. In this stage, stock concentration is important and although high stock concentration has been found to be desirable, there is a limit in this direction because of the tendency of the refiner to surge and the load to swing with a thick feed. When the stock concentration is low the flushing effect between the plates tends towards the production of a coarser product. A stock concentration of 5.0 to 5.5 per cent has been found most suitable; refining load is steady, the pulp circulates well in storage and is satisfactory for pumping.

Stock leaving the first stage is unaltered in concentration before becoming the feed to the second stage. The stock is prone to aerate and froth badly at this refiner if the feed falls below 4.0 per cent consistency. This frothing upsets circulation in the chest, the fibers separate and rise to the surface in a solid mass. Chest levels are therefore kept low and the addition of dilution water at the refiner is avoided. If necessary, dilution is done at the first stage operation and if the stock concentration leaving this stage is kept steady, the first two stages can be run for hours without the smallest adjustment. Stock concentration of the feed to the third stage ranges within wider limits, but here again 5.0 per cent is an ideal consistency. The stock feeds smoothly from the uniflow, flows down the bent leg chute in an unbroken stream to the refiner and requires a small amount of dilution water after the refiner to bring it to 3.5 to 4 per cent for storage.

Plate life in the third stage refiner is much shorter than in the other two stages and on account of this short life, refining conditions alter quite a lot in a week. When the plates are new, a lower consistency feed is needed to prevent them clashing, but as they wear and the channels become shallow, it is necessary to run a higher stock concentration to maintain throughput.

The first and second stage refiners are provided with washer filtrate flush and dilution showers on the feed chutes, and the third stage with filtered water. Each refiner has several flushing lines in the casing but these are turned on only before a machine is shut down for inspection.

The following are the approximate ranges of control for all three stages of refining:—

	Stock Concentration %	Freeness C.s.f.	Dilution
1st stage	5.0 to 5.5	750-780	washer filtrate
2nd stage	4.8 to 5.3	450-510	washer filtrate
3rd stage	4.3 to 6.0	130-150	filtrate water

Freeness and Quality Control

At plant start up we had to feel our way with the manipulation of plate and control ring settings to break the chips down and refine to a freeness control in three stages of even reduction.

The first settings adopted were:—

	Plate setting (in.)	Ring setting (in.)	Ring clearance (in.)
1st stage	+.010	+.010	.020
2nd stage	+.010	+.005	.015
3rd stage	+.005	+.005	.010

The full motor load could not be taken up with these settings and they were varied to do so by bringing both plates and rings closer together, maintaining a small positive ring clearance all the time. Although maximum load was applied in all stages, we were still unable to bring the ultimate freeness below 250 C.s.f., and low pulp strengths resulted. In effect, it was found that the plates were being kept apart with these settings and by backing the peripheral rings off it was possible to run under full load with the plates brought closer together. This had the desired effect of transmitting work to the fiber bundles and we were then able to run each refiner with close control of freeness at high output.

After new plates have been run in, the following settings are used:—

	Plate setting (in.)	Ring setting
1st stage	+.005	Backed right off
2nd stage	+.010	Backed right off
3rd stage	—.020	Backed right off

In the second and third stages the plates are being held apart by the feed and the machines are under tension. In these two machines the rings can be backed right off only after the plates have been run in. When new plates are being "run in," the stock flow is choked with the rings to prevent the plates rubbing together. This running in period takes from 24 to 48 hr. in the third stage, and while choking is being done, the rings are given the maximum clearance to a point within .001 in. of where the plates will rub together. Without the aid of control rings on these occasions, it would be necessary to run for long periods on light load with reduced throughput.

Having established control over freeness by manipulation of plate and control ring settings, pulp strengths for a given freeness were still well below those obtained in the laboratory using the same soaked chips. Typical values were:—

Refining	Bulk	Burst Factor	Tear Factor	C.s.f.
Lab.	2.21	21.8	51.3	150
Plant	2.60	14.0	35.0	175

This trouble was due to wide fluctuations in both stock concentration and rate of feed to the refiners. It was overcome by (1) reducing stock level and improving agitation in the first and second stage storage chests to stop the tendency for the stock to float (2), mechanical improvement in the design of the second stage rotaflow feeder and (3) uniform take-off of the pulp cake from the washer which feeds to the third stage refiner.

Refiner Plates and Control Rings

Plates are available in many different patterns with peg tooth, saw tooth, vee tooth, square tooth and dimpled surfaces.

With one exception, the only plates we have used to date have been of the saw tooth pattern. One set of coarse plates wih square teeth, (catalogue No. 18035 and 18035A,) proved unsatisfactory in the primary refiner because of fiber jamming in the channels. This tendency to pack in the channels is not evident in the saw tooth plates, even with those having a fine refining pattern.

Plate patterns we have tried to date are:—

First stage.—
S.W. plates Nos. 17998 and 17998A, and 18035 and 18035A.

Second stage.—
17591 and 17591A.

Third stage.—D3220 and D3220A, 18-000 and 18000A, 17591 and 17-591A.

The first stage plates, 17998, are a moderately coarse plate and combine breaking with refining. The three inner zones are tapered to allow the chips to enter this breaking down area readily while the outside zone has a mating pattern which does a certain amount of refining. Both second and third stage refiners perform a purely refining function and to date no distinction has been made in plate selection for them.

All plates used so far in these stages have a short tapered bay and three refining bays. In the refining bays, the proportion of land increases and the channels become shallower with each bay as the stock moves from the center to the outside of the plate. The 17591 and 18000 patterns are similar, the principal difference being the lie of the teeth, so that the 17591 plates have a sharp to sharp action and the 18000 a dull to dull. The D3220 plates combine

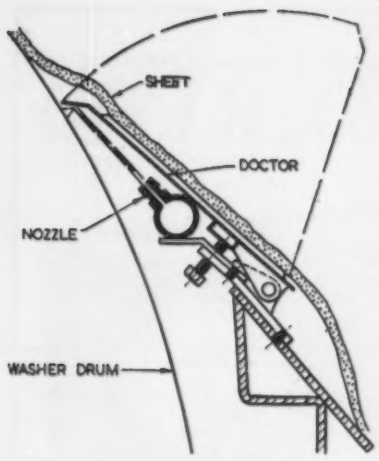


Fig. 6—Hydrain discharge.

sharp to sharp and dull to dull, with the teeth crossing in direction in the middle bay. The D3220 plates give out a most disconcerting operating tone under load while the other two patterns operate very smoothly with no significant differences in performance.

The following two control ring types have been tried:—

No. 17009—a dimpled pattern—third stage.

No. C1956—a ribbed pattern—first and second stages.

The rings of the rotor plate lie in the same plane as the refiner plates and are moved during plate adjustment while the rings on the stator head can be moved independently by a handwheel on the swing head. Hence the control rings can be set with a clearance different to that of the plates. Both half sets of matching rings have a closed periphery and in our first stage refiner, we have ground the periphery of the stator set to open the channels and have adjusted our control rings to a point where the motor load begins to increase, with the object of increasing the area of refining surface. This has given a less shivey product and increased throughput at constant freeness. We propose to do the same in our second stage.

Plate Materials—Their Life

Plates were available in three materials, namely, 400C which has a 17 per cent chromium content; white iron, a white cast iron of high carbon content; Ni hard, a white iron with 4 per cent nickel.

Because of the serious effect dissolved iron can have on the brightness of our pulps, 440C stainless steel plates were first mounted in all stages. From the outset, it could be seen that reasonable plate life would be obtained in the first stage, but plate life in the second and third stages was disappointing.

Plates in the second and third stages showed signs of galling, with teeth in the first and second bays developing deep serrations. Thus refining was confined to the third bay where the rate of wear became very rapid.

The following plate life resulted with 440C plates in the respective stages.

Plate	Stage 1st	2nd	3rd
17998	2700 hr.	—	—
17591	—	1600 hr.	750 hr.
18000	—	—	570 hr.
D3220	—	—	320 hr.

Despite the high rate of plate wear, the amount of iron entering the stock from the plates at no time exceeded one part per million and therefore it was decided to mount Ni hard plates in the second stage. The first set of Ni hard plates operated for 2240 hr. and the added iron in the circuit was practically negligible. Frequent inspections showed slight corrosion to be taking place, but this was in the channels, the refining surfaces being perfect in all three bays. During the time these plates operated, pulp strengths remained normal, but at the end of their life there was a sharp reduction in pulp strength. With the apparent success of 17591 Ni hard plates in the second stage, 18000 Ni hard plates were installed in the third stage. These operated for 1450 hours maintaining perfect lands in all three bays during their entire life. During these tests, Ni hard plates were being used simultaneously in second and third stages and again iron added to the stock was less than one part per million. In addition to improving plate life in the second and third stage refiners, the use of Ni hard plates has reduced the overall plate cost from 15/8 to 3/2 per ton of pulp. White iron plates of the 17591 pattern were also tried in the second stage refiner, but these quickly corroded and had to be removed after ten days.

Packing of feed in the bent leg chute has been found to be the first sign that plates are approaching the end of their life. By increasing the stock concentration of the feed rate throughput can be maintained until it is convenient to make an inspection. The closed periphery of the rotor plate in the second and third stages wears more slowly and grinds away the outer edge of the stator plate, thus sealing the channels and preventing stock from escaping. By grinding the periphery of the rotor plate away to open the channels, plate life has been doubled. This grinding is done in position with a portable hand grinder and is usually done three times before the rotor plate also becomes "flat"; loss of time being approximately half an hour for each grinding. Plate wear in the first stage is opposed to the wear in the other stages with the rotor plate closing up while the stator teeth are barely worn. However, grinding is not used to prolong the life of these plates.

Screening

In the flow sheet, provision was made to screen between second stage refining and washing and the circuit was arranged to pump from second stage storage direct to the screen from where the screened stock would gravitate to the washer. Provision was also made to bypass the screen and go direct to the washer. Screen rejects were to be pumped to a flat bed drainer, situated above the soaked chip bin, the recovered oversize dropping back into the bin. Considerable difficulty was experienced in screening at one per cent with .055 in. plate perforations and this section was bypassed. The refined product from the third stage has been found to be free of shives, but it might be necessary to introduce a cyclone type separator into the circuit to remove dirt and gum specks.

Washing

An Oliver United vacuum filter was installed for filtering and washing by displacement. This washer is 12 ft. by 8 ft. dia. with a hydraulic drive through a variable speed range of 0 to 6 rev./min. Provision of bridge pieces in the valve enables the suction area to be varied from 248° to 278° and submergence from 18 to 41 per cent. By varying the speed and/or the suction zone the washer has the scope to handle all feed rates from one to four tons per hour.

The washer is fed with one per cent stock, operated at 1.5 to 2.0 rev./min. and three displacement showers are used. Washing efficiency, as calculated by water soluble removal and by the intensity of the colour in the feed and the cake, has been 95 to 97 per cent.

In addition to the other provisions, the washer was supplied with alternative take offs, fluted roll and Hydrair. The Hydrair, which is adaptable to air, steam or water is illustrated in Fig. 6.

All methods of take off were tried and the Hydrair with an air shower was found most suitable for our purpose. With it we are able to run a moderately thin cake which washes well and carries into the repulper in a continuous web. As there is no buffer storage between the washer and the third stage refiner, the need to have a continuous and unbroken cake coming away from the washer is vitally important. The fluted roll was fairly satisfactory only with a thick cake and at slow washer speed. The thick cake did not wash well and it continually broke between the fluted

TABLE I—PRODUCTION OF COLD SODA PULPS FROM MIXED *E. REGNANS*

(Periods are averages for weekly operation, identical periods are used in Tables II & III.)

Period	1	2	3	4
Caustic soda charge % ..	8.7	8.7	8.7	8.7
Caustic soda absorption %	6.68	6.35	6.26	6.55
Plant throughput tons o.d. chips/hr.	1.59	1.47	1.52	1.48
1st stage refiner cons. %	5.7	5.5	5.3	5.5
C.s.f. ..	782	775	756	758
hp.dy/ton pulp ..	16.4	18.0	16.6	17.1
2nd stage refiner cons. %	5.2	5.2	5.3	5.2
C.s.f. ..	494	480	468	470
hp.dy/ton pulp ..	15.8	17.0	15.9	16.8
3rd stage refiner cons. %	5.0	5.0	5.1	4.9
C.s.f. ..	142	140	137	137
hp.dy/ton pulp ..	15.2	16.6	15.9	16.7
Energy input refining hp.dy/ton pulp ..	47.4	51.6	48.4	50.6
Pulp values—				
Bulk	2.38	2.34	2.42	2.27
Burst factor	19.0	25.3	21.5	21.9
Tear factor	46.7	46.4	43.1	46.2

Data in Tables I, II, & III all refer to cold soda pulp made from Eucalyptus Regnans.

TABLE II—COMPARISON OF STRENGTH PROPERTIES OF COLD SODA AND GROUNDWOOD PULPS

Period	Pulps	Burst factor	Tear factor	Energy Input C.s.f.	Energy Input hp.dy./ton
1	Cold soda pulp	19.0	46.7	131	47.4
	Groundwood pulp	6.4	17.5	53	83.0
2	Cold soda pulp	25.3	46.4	139	51.6
	Groundwood pulp	6.7	19.1	69	85.0
3	Cold soda pulp	21.5	43.1	123	48.4
	Groundwood pulp	7.1	18.5	70	87.3
4	Cold soda pulp	21.9	46.2	142	50.6
	Groundwood pulp	7.7	19.7	68	85.5

TABLE III—EFFECT OF COLD SODA PULP ON PAPER MACHINE RUNNING

Weekly periods	1 Mc. 2	2 Mc. 2	3 Mc. 2	4 Mc. 2
Per cent groundwood ..	61.6	61.4	63.2	61.3
Per cent kraft	18.3	18.7	18.8	18.7
Per cent cold soda	20.1	19.9	18.0	20.0
Mixed Stock—				
Bulk	2.50	2.41	2.44	2.51
Burst factor	12.4	12.3	13.1	12.4
Tear factor	61.6	63.2	64.1	63.7
C.s.f.	129	125	146	138
Machine speed ft./min. .	1270	1282	1288	1298
Paper—				
Burst lb./sq. in.	8.8	9.1	9.2	9.5
Tear M.D. g.	17.8	18.3	19.5	19.8
Tear C.M.D. g.	27.8	27.7	28.3	28.9
Smoothness	34	37	35	32

roll and the repulper. This, combined with the slow washer speed, meant that feed to the refiner was not regular. The Hydrair with water was better than the fluted roll; a thin cake, allowing good washing was possible, but the water tended to pierce the cake and caused it to break off before the repulper. The Hydrair steam was satisfactory for removing the cake, but its use was discontinued owing to creep in the washer deck wires. Hydrair with air, has been most successful. Cakes of varying thickness are efficiently removed in a continuous web and the air pressure used is 5 to 10 lb./sq. in.

Results Obtained

Results being currently obtained from the treatment of mill run *E. regnans* are tabulated in Table I and together with the results obtained from other wood species (Table IV), illustrate that the installed plant is meeting the requirements of production, quality and power absorption specifications.

In Table II a direct comparison is made between cold soda and groundwood pulp strengths and the power input advantage of the cold soda process is illustrated.

The influence of cold soda pulp on mixed stock and newsprint strengths is shown in Table III and in Table V a comparison is made of No. 2 paper machine performance with and without the addition of cold soda pulp to the furnish. The comparison shows an advantage of over 100 ft./min. running speed and an annual increase in production of over 2,500 tons of newsprint, using cold soda pulp.

TABLE IV—PRODUCTION OF COLD SODA PULPS FROM VARIOUS WOOD SPECIES

(Results are for full scale plant tests.)

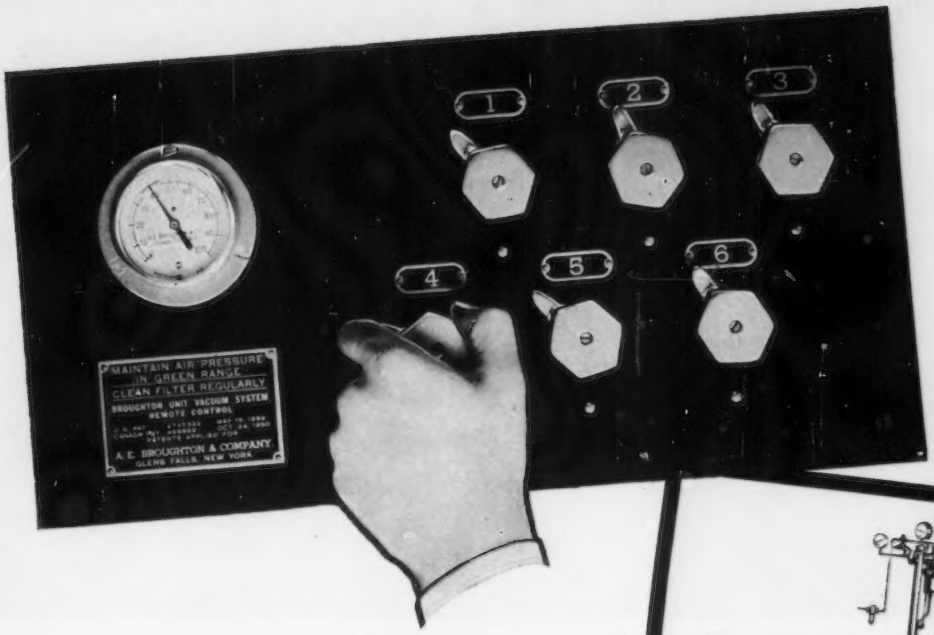
Species	Old growth regnans	Pole regnans	Old growth obliqua	Pole obliqua	E. gigantea	Sassafras
Wood age yr.	200-400	35	300-400	40	300	150
Caustic charge %	9.2	9.0	9.2	8.7	8.7	9.2
Caustic abs. %	6.7	6.8	7.57	5.8	7.05	5.81
Plant throughput tons chips/hr.	1.22	1.0	1.20	1.09	1.57	1.46
First stage cons. %	5.9	4.1	5.9	5.9	7.6	7.9
C.s.f.	773	671	778	757	780	815
hp.dy./ton pulp	18.5	24.6	18.9	21.3	14.7	17.2
Second stage cons. %	5.0	2.2	5.3	5.0	5.3	5.4
C.s.f.	521	403	482	457	481	478
hp.dy./ton pulp	17.9	23.2	18.2	20.9	14.2	17.3
Third stage cons. %	4.7	2.8	4.9	4.6	5.2	5.5
C.s.f.	143	179	141	142	142	133
hp.dy/ton pulp	17.5	18.7	18.0	20.6	13.5	16.2
Energy input refining hp.dy/ton pulp	53.9	66.5	55.1	62.8	42.4	50.7
Pulp—						
Bulk	2.22	1.95	2.33	2.09	2.27	2.14
Burst factor	22.6	32.7	17.3	26.3	21.9	19.2
Tear factor	48.6	59.0	38.4	52.0	46.5	44.4

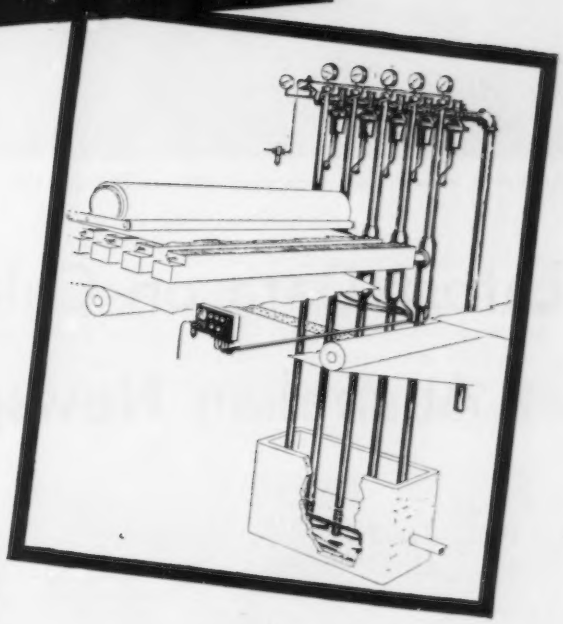
TABLE V—INFLUENCE OF COLD SODA PULP ON NO. 2 MACHINE RUNNING

Comparing periods Dec.-Jan.-Feb., 1956-57 – Dec.-Jan.-Feb., 1957-58

Period	Dec.-Feb. 1956-57	Dec.-Feb. 1957-58	Period	Dec.-Feb. 1956-57	Dec.-Feb. 1957-58
Per cent Groundwood ..	81.4	61.7	Machine Speed f.p.m. ..	1147	1283
Per cent Kraft	18.6	18.8	Production tons	11316	11992
Per cent Cold soda	Nil	19.5			
Mixed stock—			Paper tests—		
Bulk	2.52	2.46	Burst lb./sq. in.	7.4	9.3
Burst factor	9.9	12.6	Tear M.D. g.	18.2	19.7
Tear factor	59.4	63.5	Tear C.M.D. g.	27.8	29.2
C.s.f.	126	133	Smoothness	39	33

Lick These Six Problems with One Hand!





One Hand on the Remote Control of the Broughton Unit Vacuum System will eliminate, or, at the least, greatly reduce these problems . . . .

1. Loss of loading and fine fibre
2. Loss of color
3. Two-sidedness
4. Wire-marking
5. Varying water mark
6. Fingering under the dandy

This is achieved by accurate, positive control of individual flat-box vacuums, maintaining a graduated application of vacuum in increasing or decreasing stages on the boxes.

When you consider also, the savings effected by the probable elimination of the flat-box vacuum pump, you must agree —

HERE IS A VACUUM SYSTEM WORTHY OF YOUR IMMEDIATE AND THOROUGH ATTENTION!

Write, or phone collect, for complete information.

BROUGHTON
SYSTEMS FOR PAPER MACHINES

A.E. BROUGHTON & COMPANY, INC.

GLENS FALLS, NEW YORK CABLE ADDRESS: BROUGHTCO TEL. 2-6541

Panoramic view of cold soda plant interior. Globe soaker and screw press at right rear.

Latest Data on Cold Soda Pulping at Australian Newsprint Mills

E. J. Bugg
Pulp Mill Superintendent
Australian Newsprint Mills

This report is supplementary to previous publications on the cold soda mill and outlines in summary results obtained in the plant for an output of 65 l.t.o.d. cold soda pulp per day.

Extended Plant

Since the presentation of a paper at the A.P.P.I.T.A. Conference in Sydney last April, the cold soda plant has been raised to its designed capacity by the installation of three additional Sprout Waldron refiners.

The arrangement of refiners now is, two first stage, two second stage, and two third stage. The new refiners differ from the original three, only in that two are six hundred horse power and these are installed one each in second and third stage.

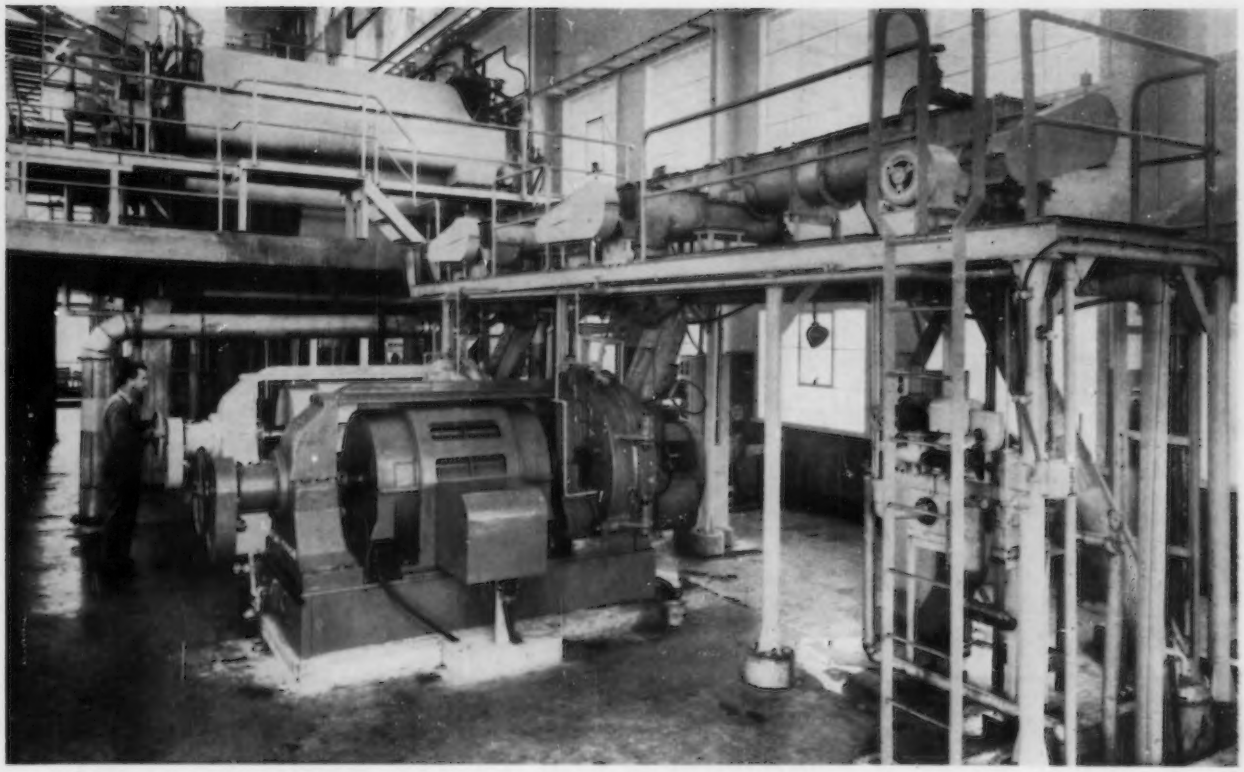
Plant Operation

These new units first operated on September 2nd and since then the furnish to the two paper machines has been maintained at:

60% Groundwood Pulp
22% Cold Soda Pulp
18% Semi-bleached Kraft

The demand for 50 l.t.o.d. per day cold soda pulp has been met with ease by the extended plant, which under long test periods of full production, has established the following figures:—

Caustic Soda usage, 6.35% on wood
Plant Capacity, 73 l.t.o.d. chips/day
Plant Yield, 90%
Power Input, refining, 50 H.P.D./l.t.o.d. pulp
Power Input, full plant, 55 H.P.D./l.t.o.d. pulp
Temperature ex 1st stage, 112°F
Temperature ex 2nd stage, 134°F
Washing efficiency, 95%
C.s.f. ex 1st stage, 770
C.s.f. ex 2nd stage, 440
C.s.f. ex 3rd stage, 140
Pulp strength
2.10-2.30 Bulk
19.0-23.0 Burst F.
40.0-50.0 Tear F.
130-150 C.s.f.



Right side of interior. Pulp washer is located on mezzanine above disk refiners.

Pulp strength range is influenced by the non regnans type of Eucalypts of which we are now currently chipping 50 per cent. These woods are recognized as unsuitable for mechanical pulping but chip well and produce satisfactory cold soda pulp.

Plant Control

Plant control has been simplified by the operation of all refiners. All chests are still being held at a low level, but their quicker turnover has reduced the effect of floating stock.

Increased tonnage over the washer has not greatly affected washing efficiency.

Refiner Plates

Staggering of plate change in the second and third stage is being arranged to minimize the "running in" effect on stock quality.

Ni hard plates of the 17591 and 18000 patterns are being used, and these are lasting two thousand hours in the second stage and thirteen hundred hours in the third.

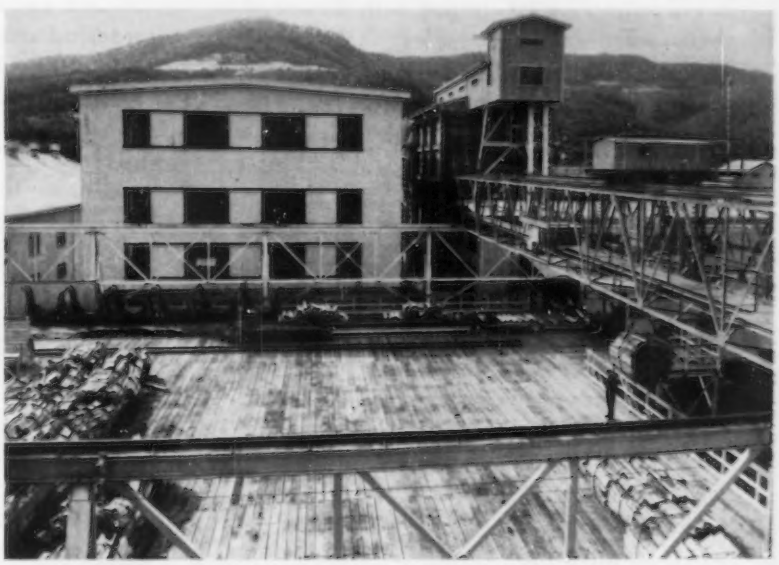
Paper Machine Production

Increased paper machine speeds resulting from the regular supply of cold soda pulp to the mixed stock furnish has resulted in a newsprint production increase of 6.5 per cent.

The FiberPress

The foregoing results have been obtained without the use of the FiberPress which is being held out of circuit pending the arrival of a one hundred horse power motor for the vertical drive and a two hundred horse power motor for the horizontal drive, together with a modified vertical shaft.

Although production and strength results being currently obtained are satisfactory, the inclusion of the press in the circuit is full of interest because of the anticipated improvement in pulp



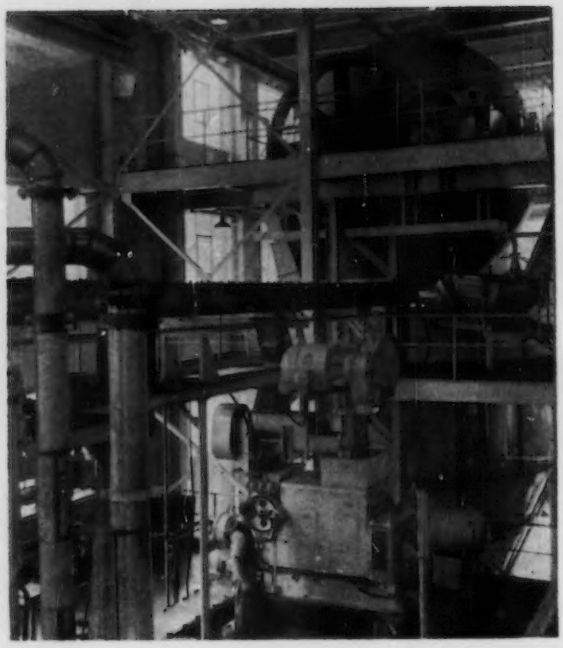
Billet handling deck with conveyors. Pulping building is at rear.

color resulting from it, and its effect on the economy of any brightening program likely to be undertaken.

Capital Cost

Since the installation of the second group of Sprout Waldron refiners, capital cost figures have been published and these are as follows:

Capital cost of completed plant	£615,600	$1,372,800
This cost is distributed as follows:		
Wood handling, chip preparation and storage	148,600	331,380
Solid Caustic Soda dissolving plant	20,300	45,270
Pulp preparation and power distribution	388,500	866,360
Pulp storage, proportioning and general service	58,200	129,790



Close-up of globe soaker and S-W Anderson FiberPress.

The First Complete Book In Its Field...

PULP AND PAPER MILL INSTRUMENTATION

By filling in and mailing the handy coupon today, you will be among the very first to benefit by this practical hard-bound volume.

In 117 large 7" x 10" pages, with dozens of charts, diagrams and tables, PULP AND PAPER MILL INSTRUMENTATION brings you full details on instruments for your mill, their selection, their use, and their maintenance.

Contents Include:

Measurement of Process Variables
Principles of Automatic Control
Kamyr Continuous Kraft Pulping
High Yield Sulphite Pulping
Chemi-Groundwood Mill
Automatic Reduction and Handling of Instrument Data
Paper and Board Mills
Kraft Pulp Mills
Sulphite Pulp Mills
Continuous Semi-Chemical Pulping
. . . and much more!

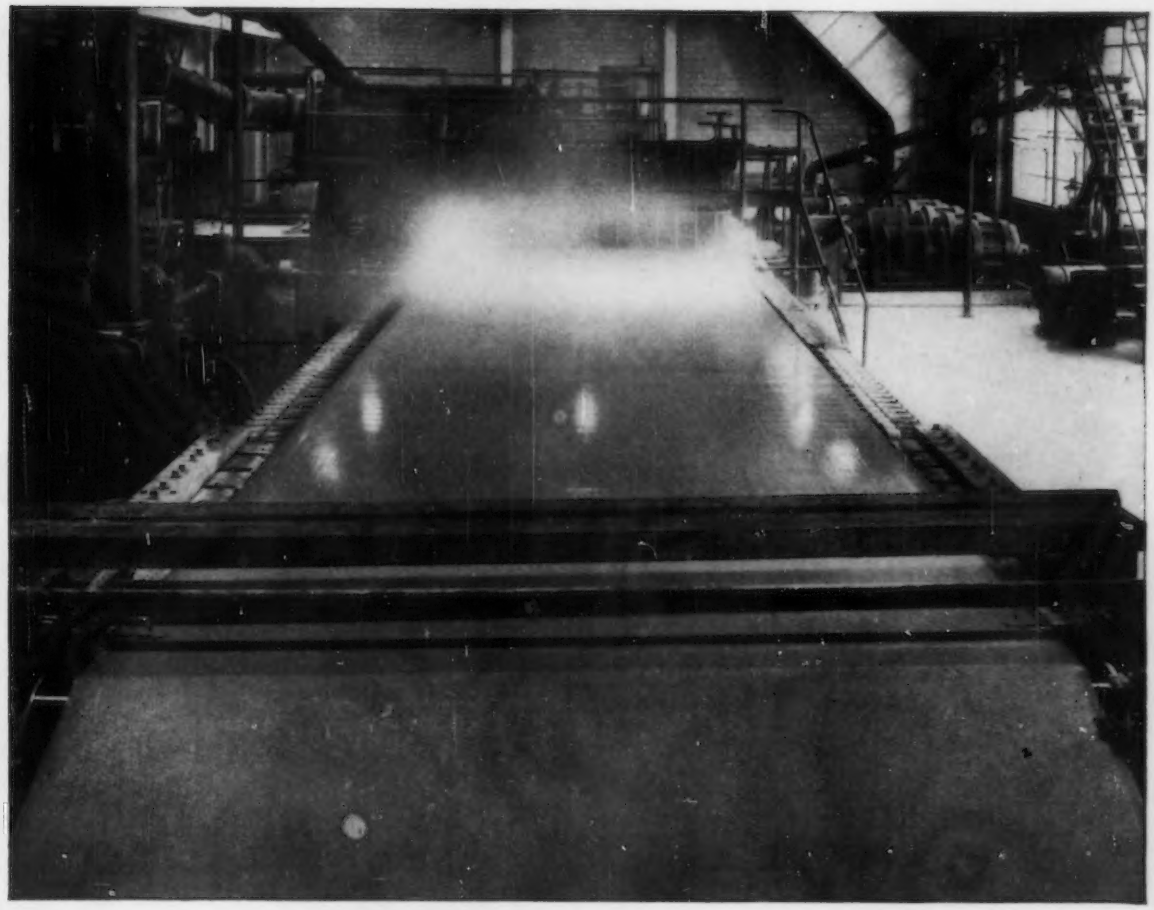
Be sure you get a first edition copy of this practical volume by E. J. Cole and M. Todd. Add PULP AND PAPER MILL INSTRUMENTATION to your bookshelf today.

LOCKWOOD TRADE JOURNAL COMPANY, INC.
49 West 45th Street, New York 36, N. Y.

Yes, rush me post-paid a First Edition copy of your just-published book, PULP AND PAPER MILL INSTRUMENTATION at $3.50.

☐ Payment Enclosed

Name..... Title.....
Company .....
Address .....
City..... Zone..... State.....



A Complete Starch Line... *tailor-made to your needs*

Today's complex papermaking operations require a wide range of starches—starches specifically designed to do a particular job. You'll find that the complete starch line offered by Corn Products Company includes types for every phase of modern papermaking. These starches are available in so many varieties that *they can literally be tailor-made to suit individual requirements* and production problems of individual plants!

For example, in beater sizing, preferred starches for improved surface qualities plus excellent bursting and tensile strength, include the many varieties of Globe and pre-cooked Amijel. For calendar sizing, you'll find a complete line of Claro and Eagle starches, as well as Globe starches for enzyme conversion. In this operation, Globe and Excello dextrines and thin-boiling Foxhead starches are also used. For general coating, with good viscosity at high solids content, use Claro and new improved Ten-O-Film starches.

And the research staff of Corn Products Company, largest in the industry, is constantly at work developing new products to meet the changing needs of modern papermaking.

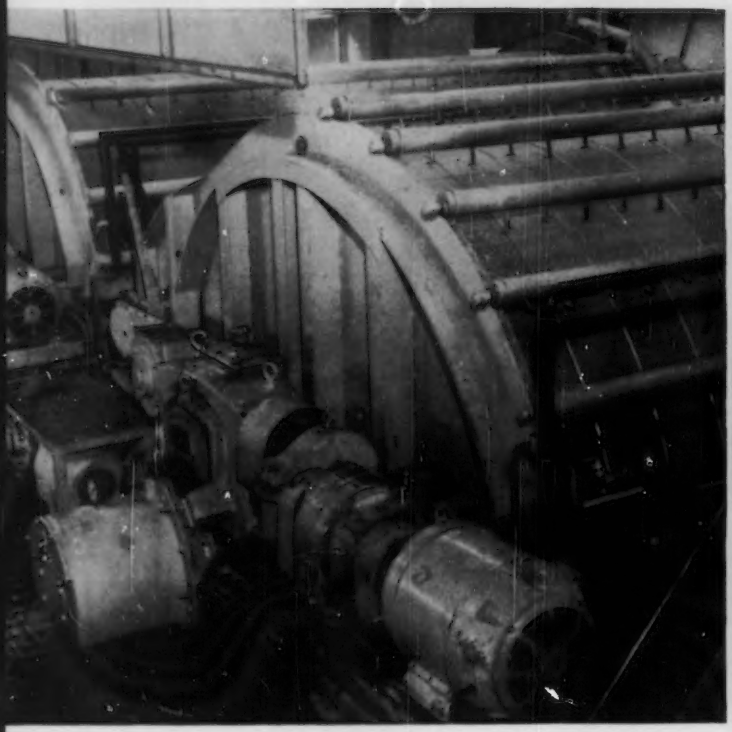
Our technical representatives are completely versed in the problems that arise with wet end additives. Their impressive field experience and continuing research into starch, evidenced by frequent publications in trade and technical journals*, is always at your service. Take full advantage of the facilities and experience of the world's largest corn processors—call our nearest sales office or write direct.

Fine products for the Paper Industry: GLOBE® • EAGLE® • FOXHEAD® • CLARO® • AMIJEL®
CORAGUM® • TEN-O-FILM® starches • GLOBE® • EXCELLO® • LAM-O-DEX® dextrines and gums.

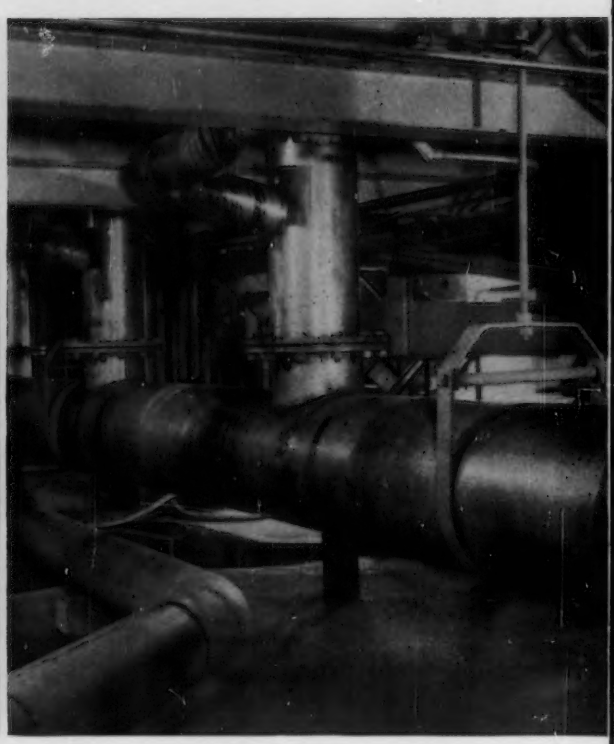
CORN PRODUCTS SALES COMPANY · 17 Battery Place, New York 4, N. Y.

*A reprint on the results of corn starch usage is available on request from our New York office.

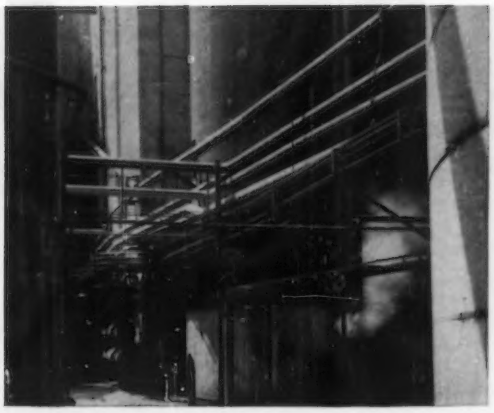
How Stainless Steel helps convert



Pulp washers have Stainless Steel shell, deck, facing and binding wire, and shower heads.



Weyerhaeuser installed this Stainless pipe in 1955. Every bit is still in excellent condition.



Stock and liquor lines to and from blow tank are made from 10- and 12-gage Stainless Steel.

hardwood to paper pulp

at Weyerhaeuser Timber Co., Longview, Washington

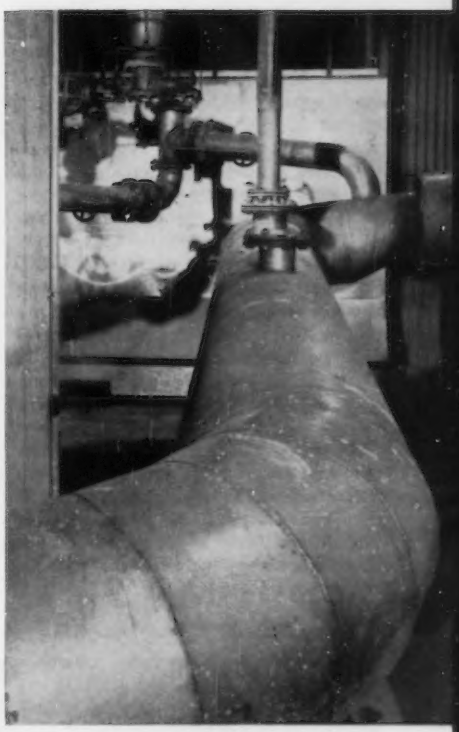
There was a time when hardwoods had little commercial value in the paper industry. But with the introduction of the neutral sulfite semi-chemical process of paper pulp production, hardwoods took on a new importance. Though their conversion calls for the use of highly corrosive chemicals, Stainless Steel equipment makes such an operation feasible because Stainless resists corrosion.

Stainless Steel is used right in the beginning of the Weyerhaeuser process—in the digester where hardwood chips are cooked under pressure in the cooking liquor. From here, the fibers begin a series of washings and refining—and wherever corrosive chemicals are used, Weyerhaeuser uses Stainless Steel equipment.

They installed Stainless Steel pipe to carry the spent liquor when it's drawn from the fibers and pumped to the chemical recovery system. The pipe was installed in 1955, and Weyerhaeuser reports that it's still in excellent condition. They haven't had one problem with corrosion.

Beat corrosion in *your* plant. Build and repair old equipment with Stainless Steel. And for service-tested quality, specify USS Stainless Steel.

USS is a registered trademark



Notice how Stainless Steel is easily formed, readily welded. Weyerhaeuser fabricates much of their Stainless equipment right in their own shop.

USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Why Chesapeake Uses Screw Press Washers on Kraft Board Stock

By E. L. Dozier, pulp mill superintendent, Chesapeake Paper Corp., as told to P. D. Van Derveer, associate editor of Paper Trade Journal.

While most modern kraft mills use the well-known vacuum drum type washer, Chesapeake Corp. of Virginia has had considerable success with an entirely different type, the screw press washer. Certain features of this equipment appear to be especially advantageous in their operation. Other kraft mills have considered this type of equipment, and in some cases have given it a mill trial, but nearly all of them have turned to the vacuum washer. As far as is known, only one other mill is operating screw press washers on kraft.

The problem seems to be in the type of pulp being produced, since many mills are using the screw press in semi-chemical pulping operations, apparently without difficulty. Yet, in kraft pulping, the operational problems appear to have precluded wider usage.

On the other hand, Chesapeake has not only been operating a screw press system since 1941, but has continued to add similar units as production increased, until they now have three lines (4 units each) of screw press washers with potential capacity of 900 tons per day. The mill over-all has a productive potential of 750 tons.

Why, then, has Chesapeake been able to successfully operate this equipment while other mills have encountered many operating difficulties? To answer this question Paper Trade Journal interviewed E. L. Dozier, pulp mill superintendent at the West Point, Va., plant.

• • •

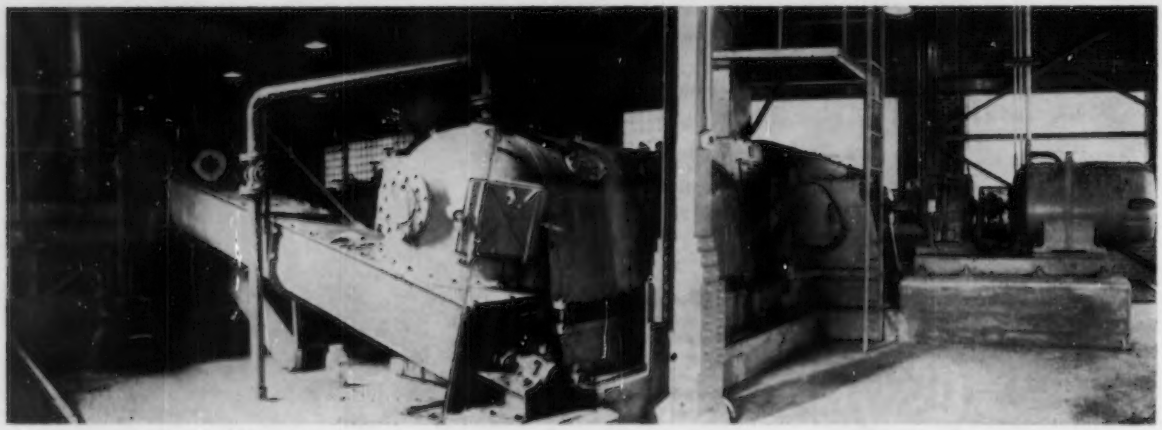
Our reasons for using the screw press washer extend, perhaps, way back to 1941 when our first installation, a line of three units, was made. At that time, kraft mills were using diffusers to wash their pulp, and vacuum washers were just beginning to gain recognition. Both the vacuum washer and the screw press were being offered as improvements over the old washing methods, but neither type of equipment had been perfected by any means. It seemed that there was little to choose between the two; yet certain advantages, inherent in the screw press equipment, appeared to fit the requirements of our operation, and the installation was made.

Through the war years, we gained experience in this type of washing method. True, we had our troubles, but we overcame them. The experience gained at this time was probably another important factor in our continued use of the screw press. Besides, we were well satisfied with the results we were getting from them.

This, at least partially, explains why we installed the screw press washing system and have continued to increase washing capacity by the addition of similar equipment. It might now be of interest to describe here our past and present installations, and why certain features have been developed A discussion of maintenance requirements, efficiency and advantages should also be of interest.

Past and Present Installations

The first line of screw press washers installed here consisted of three units with a capacity of 120-130 tons per day. Each press had a 3-stage worm with wash water added at three separate points, making a total of nine fil-



Screw press washer built by Valley Iron Works is one of four such units in recently installed washing system. At left, vertical screw conveyor lifts pulp stock 40 feet to rubber belt conveyor leading to high density storage tanks.

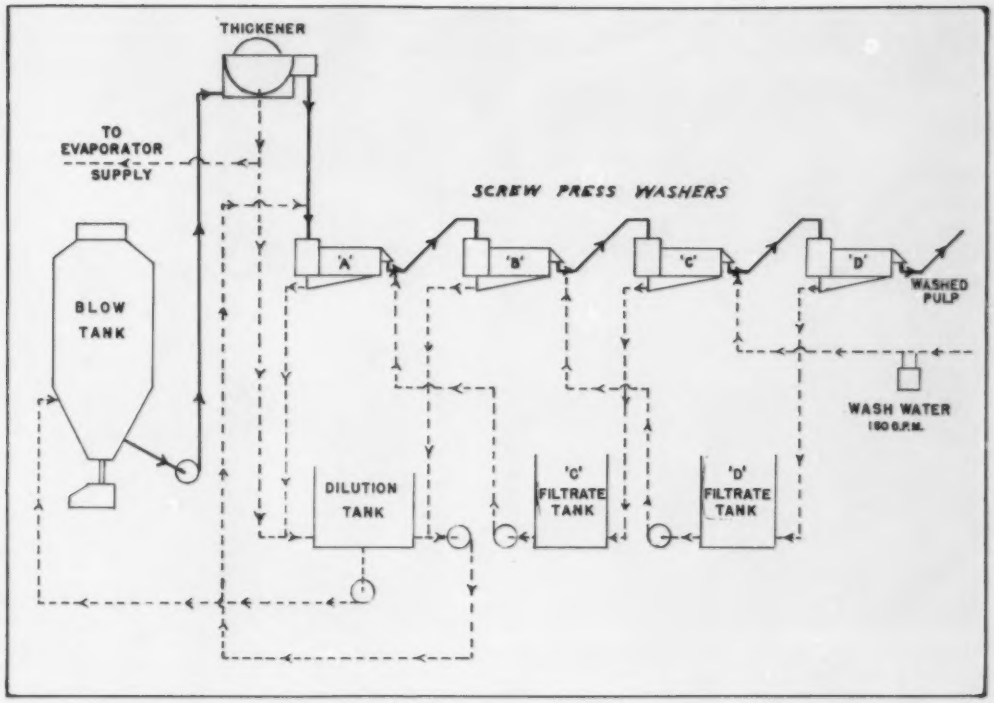


Figure 1. Four-unit screw press washing system at Chesapeake requires only 180 g.p.m. of wash water. Capacity is 300 tons per day.

trate stages for the line of washers. Five filtrate tanks were used.

This system performed reasonably well, doing the required job, but it was felt that certain improvements could be made, and during the period 1946-1948, several modifications were tried. The result was that the 3-stage worm was done away with, and replaced by a single-stage worm. With the single-stage worm, wash water was added immediately following the screw press, and not at all within the unit. This meant that only two filtrate tanks need be used where five were needed before. Another feature of this development was the fact that direction of rotation for the single-stage worm could be quickly reversed if plugging occurred. In this way the unit would clear itself. This had not been the case with the 3-stage worm. Due to its design, reversed direction of rotation would not clear it.

These important improvements were accomplished with no loss in washing efficiency and a gain in capacity. In fact, capacity was now increased to 300 tons per day for the same line of three units that had been installed in 1941.

These modifications were followed by the installation of a second line of three screw presses (started Nov. 1949) and later by the addition of a fourth press to each line. With the addition of a fourth stage it was possible to either (1) reduce the wash water, thus increasing total solids to the evaporators, or (2) maintain the existing evaporator load and take the saving in salt cake, or (3) increase the tonnage without changing the losses and liquor density.

Flow of Stock and Filtrate

Our most recent installation, another four-unit line, was started up in May of this year and makes our third washing system of this type. The screw press washers were supplied by Valley Iron Works of Appleton, Wis. The system is shown in Figure 1.

In operation, stock is pumped from the blow tank at about 5 per cent consistency to a Valley underflow thickener which discharges the pulp into the feed chute of A press at 11 per cent. Filtrate from B press is added here as a final consistency adjustment to about 10 per cent.

The stock is discharged from A press around 35 per cent consistency and is repulped with filtrate from C press as it drops into a screw conveyor going to the feed chute of B press. Consistency here is again about 10 per cent. The same cycle is repeated through B, C, and D presses with the pulp finally being conveyed to high density storage at approximately 20 per cent.

An important consideration here is to prevent formation of nodules. This is accomplished by the addition of screen room water into the canopy of the last press as the pulp is discharged at 35 per cent consistency. The pulp, as it is released from the high pressure of the screw press, will quickly pick up water. Any tight knots will easily expand.

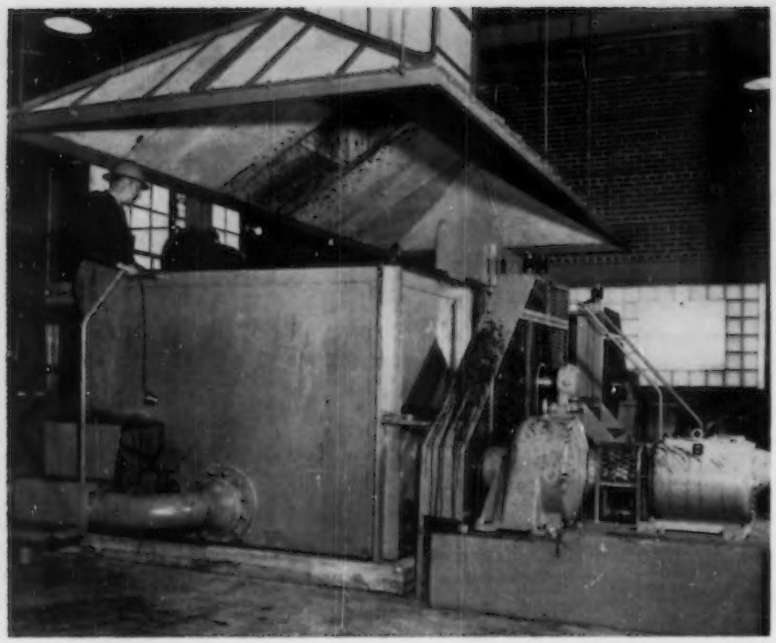
The flow of filtrate in this system is counter-current to the flow of stock. Initially, wash water from the screen room is fed into the canopy of C press to serve as dilution water as the stock is repulped by the action of the screw conveyor. The stock feeds into D press, and filtrate removed by the action of the press flows from here to a filtrate tank. This filtrate is used as dilution water following B press, and in a similar manner, C press filtrate dilutes the stock following A press.

The filtrate from B press is used to maintain consistency of the stock previous to its entry into A press. The remainder of this filtrate together with A press filtrate and a small amount from the thickener is used for dilution in the blow tank. The major part of the filtrate from the thickener goes to the evaporators.

This system is entirely closed with the only losses being in chemical taken with the pulp. Even the small amount of fiber (less than ½ per cent) contained in the press filtrates is not lost. It is filtered out at the thickener before the black liquor goes to the evaporators.

Low Dilution Factor

Particularly important here is the low water requirement of this system. The wash water is surplus screen water and totals only 180 g.p.m. for each line of



Double-drum thickener (72 inches diameter by 84 inches face) discharges pulp by gravity to the first press below.

screw presses. These low gallonages (a result of the high consistencies used in the screw presses) are handled by filtrate lines 4 to 6 inches in size and filtrate pumps which are over capacity at 7½ h.p. Only three filtrate pumps are required for a four-unit line. Another effect of the low gallonages is that the filtrate tanks need not be large; 11 feet in diameter by 13 feet in height for a filtrate tank, 20 feet in diameter by 13 feet in height for the dilution tank.

Another important feature of this system is the fact that foam is not a problem. Since this is a pressure system, there is no vacuum to draw air into the pulp or filtrate and cause foam. To further guard against foaming, exposure of pulp and liquor to air is eliminated wherever possible. With this washing method, the use of foam tanks, foam breakers, showers and defoamants is unnecessary.

Yet another point to be noted here is that black liquor from the thickener goes to the evaporators at 190-195°F. These relatively high temperatures can be achieved because the washing system does not employ vacuum and consequently is not subject to flashing.

Power Equivalent to Vacuum Washers

Power consumption with this four-unit line has been estimated to be about 1.71 h.p. per air-dry ton at 300 tons per day output. Most of the power is required by the screw presses which are driven by 200 h.p. motors in the case of the most recently installed line. (Actual horsepower is much less than this. In fact, the older units are driven by 125 h.p. motors. The latest presses have larger motors for greater flexibility and possible increases in capacity.) Other equipment in the washing system and the connected horsepower is as follows: filtrate pumps, 7½ h.p.; conveyors, 5 h.p.; thickener, 7½ h.p.; blow tank stock pump, 50 h.p.; dilution liquor pump, 40 h.p.; wash water pump, 10 h.p.; various agitators, 7½ to 20 h.p.

In comparison, power requirements for a vacuum washer system of the same capacity are estimated to be equal or greater than this system. Although the power required to drive the vacuum cylinder would be considerably less than for a screw press, the large volume of filtrate at the lower consistencies would require much larger pumps. Incidentally, piping for the vacuum washer system would also have to be of much larger size than the 4 to 6 inch piping of the screw press system.

Maintenance Requirements

During the years, we have gained considerable experience in the maintenance of these units, and perhaps it might be well to note some of the more important points.

The Valley screw press essentially consists of a compression element, or worm, which rotates in an 18-inch I.D. perforated cylinder. The worm, which is approximately 11 feet long, is made of ductile iron with the cylindrical shank tapered so that its largest diameter is at the discharge end. In other words, the trough area of the element uniformly decreases toward the discharge point while the outer diameter of the helical rib or thread remains constant. There is a minimum of clearance between the screen plate and worm which, as it rotates, conveys the pulp to the discharge end. At the same time considerable force is exerted on the pulp forcing the liquor through the screen plate.

The perforated cylinder made in sections, is of carbon steel with ⅛-inch holes which taper outward. The design of the cylinder incorporates grooves which prevent the stock from rotating as it is conveyed. In fact, if the stock is allowed to rotate, it will not be conveyed through the unit and will cause plugging. Therefore, the edge of the grooves must be kept relatively sharp. This is not a serious maintenance problem, but must be checked every 12 to 24 months. The groove edges are machined in our own maintenance department.

Repairs to the compression element are also done in our own shop, and this consists of coating the worm with stainless steel after its first year of operation. Corrosion or erosion on the cylindrical shank is usually evident after this first year, but after coating with stainless steel it lasts indefinitely. A stainless steel bead is also put on the outer edge of the thread, the point most susceptible to wear. It is estimated that it is necessary to resurface this edge only once every two to four years.

We have, in the past, used stainless steel worms and screen plates, but have found that the extra expense is not necessary. Good performance and long life have been obtained with standard materials.

Conclusion

In conclusion, we are convinced that various factors make the screw press more suitable for our operation than other types of washers. Among these factors are low initial cost, low horsepower requirements, limited maintenance and low water usage. In addition, less water goes to the sewer, reducing the pollution problem.

This equipment, however, is limited in its flexibility as to range of capacity and quality of pulp. We have three lines of screw presses, each with a capacity of 300 tons per day. Any of the lines may be stopped or started at will on the batch process, but while running must operate at fairly uniform speed and production. The pulp ranges from 15 to 35 permanganate number. Beyond this range we run into some operating problems. If necessary, the operating range of these units probably could be extended, but their present capabilities are suited to our operation.

Illustration courtesy of Good Housekeeping Magazine

Printed to perfection . . . on Rhoplex-coated paper

What makes it perfect? Good printing, yes. And a good photograph to start with. But the final touch of perfection is printing on paper that has been coated with RHOPLEX—the all-acrylic emulsion binder for pigments.

Printers like the way a RHOPLEX coating receives ink . . . its varnish holdout . . . its pick-resistant surface. Paper manufacturers like the mechanical stability and ease-of-coating of the RHOPLEX resins. Critical paper users welcome the freedom from odor of RHOPLEX-coated paper.

Write for our booklet, "RHOPLEX Acrylic Emulsions in Paper Coatings", containing full information on RHOPLEX B-60A and RHOPLEX B-15.

Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

RHOPLEX *is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.*

The C-E Chemical Recovery Unit 1954 through 1958

During the five year period beginning January 1, 1954, 37 C-E Recovery Units—ranging in size from 80 tons to 667 tons—have been purchased by the pulp and paper industry. They average 1,100,000 lbs of dry solids per 24 hours and represent a daily pulping capacity of about 13,700 tons.

Name	No. Units	Des. Press.	Steam Temp. °F.	Pounds Dry Solids per 24 Hours
B. C. Forest Products, Ltd.	1	700	550	1,600,000
Canadian Forest Products, Ltd.	1	450	750	500,000
Canadian International Paper Co.	1	300	500	900,000
Chesapeake Corp.*	1	1400	600	1,250,000
Continental Can Co.*	1	975	640	1,120,000
Crossett Paper Mills*	1	1000	700	1,500,000
Dierks Paper Co.	1	675	750	495,000
East Texas Pulp & Paper Co.*	1	700	750	1,600,000
Enso Gutzeit Oy.*	1	1075	900	1,500,000
Enso Gutzeit Oy.*	1	1075	840	1,500,000
Enso Gutzeit Oy.*	1	1400	900	1,500,000
Georgia-Pacific Paper Co.	1	700	750	1,050,000
Halifax Paper Company, Inc.*	1	1000	825	1,500,000
International Paper Co.*	1	1000	825	1,500,000
K. V. P. Co., Ltd.*	1	725	450	1,100,000
Longview Fibre Co.*	1	950	750	2,000,000
MacMillan & Bloedel, Ltd.*	1	690	730	1,020,000
Mead Corp.*	1	1025	850	1,100,000
Nekoosa Edwards Paper Co.*	1	500	700	1,050,000
North Carolina Pulp Company*	1	725	750	1,200,000
Northwestern Pulp & Power, Ltd.	1	700	750	1,400,000
Oxford Paper Co.*	1	800	725	900,000
Rauma-Repola Oy.*	1	1400	900	1,210,000
Rayonier, Inc.*	1	700	760	1,400,000
Riegel Paper Co.*	1	700	725	1,050,000
St. Lawrence Corp., Ltd.	1	700	750	1,060,000
St. Mary's Kraft Corp.*	1	700	725	825,000
St. Regis Paper Co.*	2	700	750	1,150,000
Southland Paper Mills, Inc.*	1	700	750	525,000
Taiwan Pulp & Paper Co.	1	500	825	286,000
Tecnica Cubana, S.A.	1	500	750	240,000
Thurso Pulp & Paper Co.	1	525	710	675,000
Union Bag-Camp Paper Corp.*	1	500	750	1,610,000
Union Bag-Camp Paper Corp.*	1	500	750	1,610,000
United Paper Mills, Ltd.*	1	1075	900	990,000
Weyerhaeuser Timber Co.*	1	700	750	1,050,000

* Companies which have purchased C-E Recovery Units in addition to those listed here. There are twenty-three such companies on this list. One organization has ordered six C-E units.

COMBUSTION ENGINEERING

C-E

C-163A

Combustion Engineering Building

200 Madison Avenue, New York 16, N. Y.

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT · NUCLEAR REACTORS · PAPER MILL EQUIPMENT · PULVERIZERS · FLASH DRYING EQUIPMENT · PRESSURE VESSELS · SOIL PIPE

New opportunity to advertise to the world pulp and paper market

PAPER TRADE JOURNAL (U.S.A.) announces the publication of an EXPORT SUPPLEMENT to appear at least once a month as a separate section sent only to subscribers outside the United States.

The EXPORT SUPPLEMENT carries advertising only. The rate for advertising in this restricted section is exactly half the full rate for appearing in the rest of the magazine which offers coverage of both the U.S. and other countries.

It is to be noted that subscribers outside the U.S.A. pay $20 per year for subscriptions to PAPER TRADE JOURNAL, a price that assures readership on the part of subscribers and their associates. This, linked with results of the Survey of Six Countries reported below, assures high quality coverage of important people in pulp and paper mills outside the U.S.A. . . . now at just half the former cost.

If you advertise to the world market, including U.S.A. . . .

Consider the regular issues of PAPER TRADE JOURNAL with its blanket coverage of pulp and paper mill people in the U.S. and its high readership in better mills outside the U.S. Regular rates apply.

If you are interested only in world markets outside the U.S.A. . . .

Consider use of the EXPORT SUPPLEMENT inserted in issues of PAPER TRADE JOURNAL sent to subscribers *outside* the U.S. Coverage of better mills is assured, readership appears second to none, and cost compares favorably with other publications available.

Survey of 6 countries indicates high readership of Paper Trade Journal

To determine the extent of readership of pulp and paper publications in the market outside the U.S.A., PAPER TRADE JOURNAL authorized an independent market research firm to survey pulp and paper executives in six countries. Names were obtained from directories. No mention was made of PAPER TRADE JOURNAL. Returns were received and tabulated by the independent market research firm.

Countries surveyed were Australia, Belgium, Peru, Philippine Islands, South Africa and Sweden.

Copies of the complete Survey are available on request. Meanwhile we present below the two outstanding conclusions:

1. Over 97% of respondents in the six countries surveyed read English . . . a percentage far higher than any other language.

2. PAPER TRADE JOURNAL was mentioned by more readers in the six countries surveyed than any other publication, when local circulation is omitted in order to get a true picture of world-wide readership.

Paper Trade Journal

49 West 45th Street, New York 36, New York

"the most useful paper"

PITTSBURGH, CHICAGO, DENVER, LOS ANGELES, DALLAS, MIAMI, HOUSTON, SAN FRANCISCO, SEATTLE

PAPER TRADE JOURNAL is audited annually by the Audit Bureau of Circulation, New York, U.S.A., which examines, checks and audits circulation records of member publications. Only publications that maintain fully paid subscriptions can be members. Circulation Statement on request.

Hamilton Completes Major Expansion with Many Interesting Features

One of the oldest mills installs ultramodern stock preparation system, new paper machine and an automatic paper finishing line.

John C. W. Evans
Editor,
Paper Trade Journal

Hamilton Paper Co. late last month completed a major expansion at its Miquon, Pa. fine paper mill. Paper has been made at the site of the present project for 212 years by W. C. Hamilton and its predecessors. This $4½ million program included a new paper machine to make bond and offset papers, new stock preparation system, finishing room expansion, new boiler plant and a new paper warehouse.

The company originated in 1856 when William C. Hamilton and Edwin R. Cope built a one machine mill to make a ton and a half per day of rag book and writing papers. The company grew through the years and in 1954 acquired the Michigan Paper Co. mill at Plainwell, Mich., now operated as the Michigan Division. Hamilton is the largest producer of text and cover papers in the country and important factors in business, offset, book and specialty paper manufacture. Included in the business paper line are bond, ledger, mimeograph and duplicator papers. It is believed that the Miquon mill is doing true watermarking at the fastest speeds anywhere.

The new paper machine was named "Hugo" in honor of Hamilton's board chairman, Hugo H. Hanson, in a contest among the employees. This is a tribute to Mr. Hanson's more than 30 years with Hamilton. Supplied by Black-Clawson, this machine, although not big when compared with machines for mass production grades, has many interesting features. Among these are: a movable bottom lip (apron); driven dandy, dance roll and top size press roll; double shake; specially designed wire pit, and Monel jacketed dryers after the size press.

Lane Taylor
Pres. Hamilton Paper Co.

Hugo H. Hanson
Board Chairman, Hamilton Paper Co.

Stock Preparation

The complete new stock preparation system for number eight machine was supplied by Black-Clawson Co. Pulp is slushed in a 16 foot diameter Hydrapulper, with a 90 inch rotor and driven by a 250 h.p., 600 r.p.m. 4160 volt wound rotor motor. A 3000 g.p.m. Hydrapulper dump pump conveys the slushed stock through a Shartle magnetic separator to a cycling chest, or alternately to the storage chest.

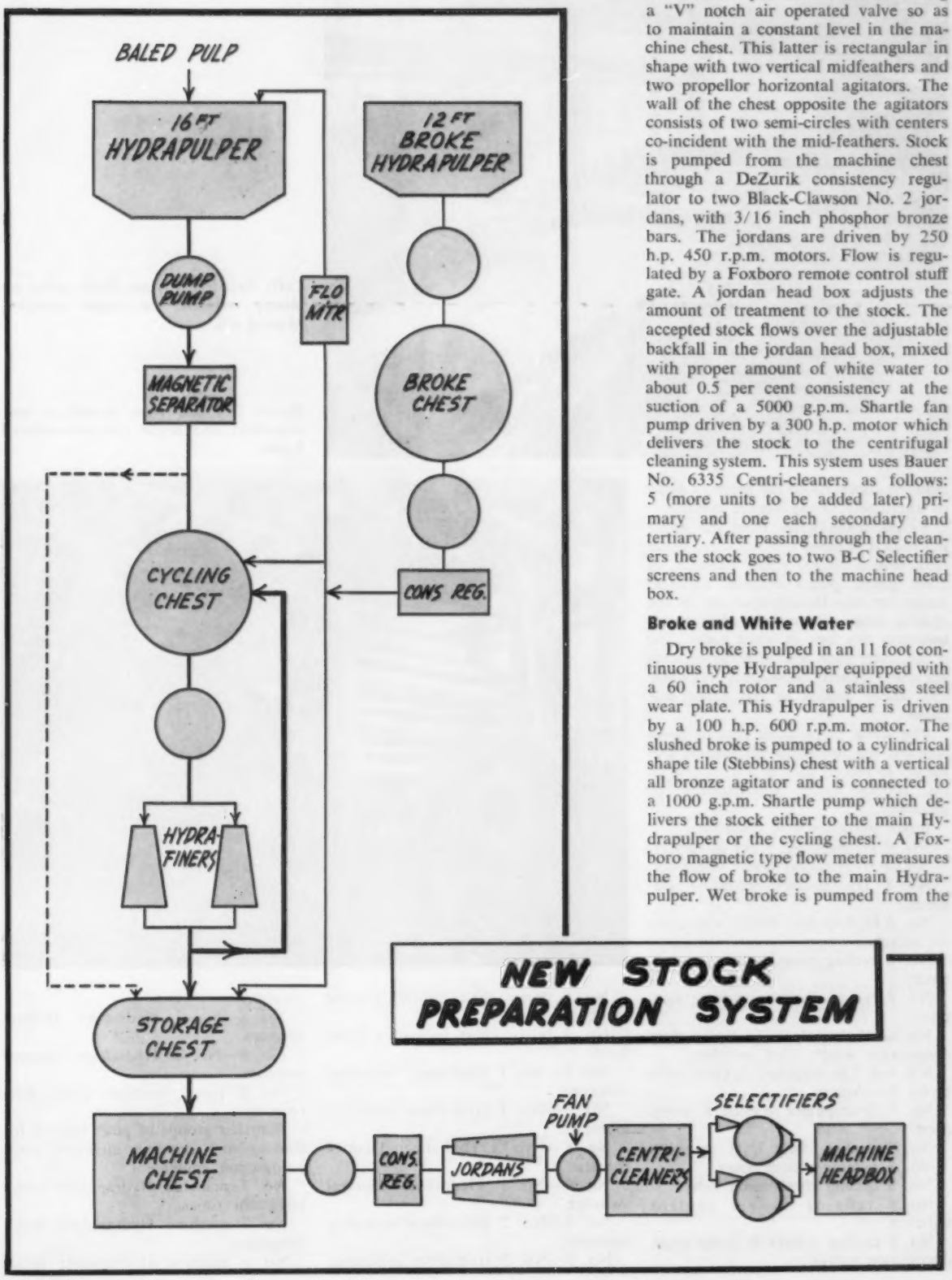
The tile cycling chest (by Stebbins) has a capacity of 2000 cubic feet and is equipped with a horizontal agitator. Stock in the cycling chest is circulated through two Hydrafiners to give the degree of treatment required. The Hydrafiners (No. 6 size) are equipped with Duotrol control units and are driven by 350 h.p. motors. Shell and bars of these refining units are Type 420 stainless steel. At the conclusion of the cycling operation the Hydrafiners discharge directly to the storage chest.

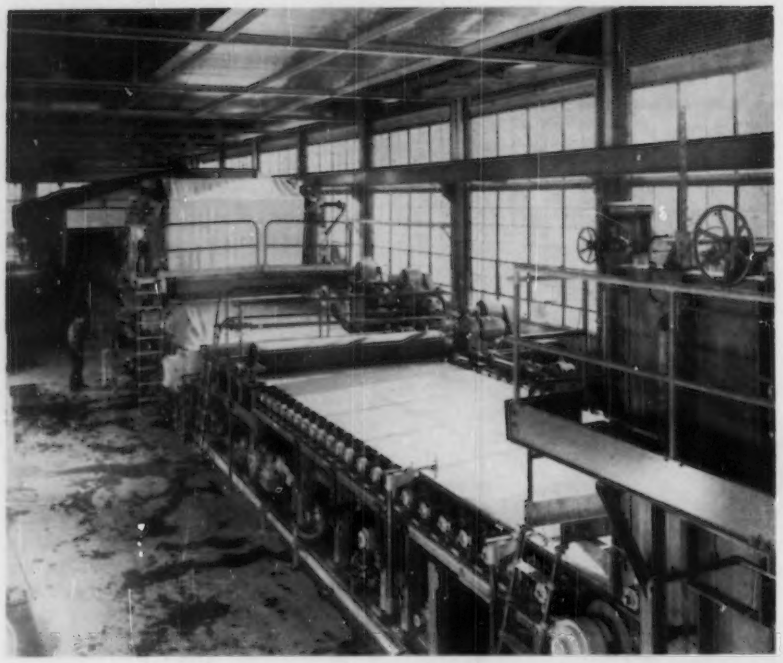
The storage chest is cylindrical shape, of tile construction (by Stebbins) with a capacity of 3000 cubic feet and has a

vertical agitator. Stock flows by gravity from the storage chest to a machine chest. Rate of flow is regulated through a Foxboro liquid level controller using a "V" notch air operated valve so as to maintain a constant level in the machine chest. This latter is rectangular in shape with two vertical midfeathers and two propellor horizontal agitators. The wall of the chest opposite the agitators consists of two semi-circles with centers co-incident with the mid-feathers. Stock is pumped from the machine chest through a DeZurik consistency regulator to two Black-Clawson No. 2 jordans, with 3/16 inch phosphor bronze bars. The jordans are driven by 250 h.p. 450 r.p.m. motors. Flow is regulated by a Foxboro remote control stuff gate. A jordan head box adjusts the amount of treatment to the stock. The accepted stock flows over the adjustable backfall in the jordan head box, mixed with proper amount of white water to about 0.5 per cent consistency at the suction of a 5000 g.p.m. Shartle fan pump driven by a 300 h.p. motor which delivers the stock to the centrifugal cleaning system. This system uses Bauer No. 6335 Centri-cleaners as follows: 5 (more units to be added later) primary and one each secondary and tertiary. After passing through the cleaners the stock goes to two B-C Selectifier screens and then to the machine head box.

Broke and White Water

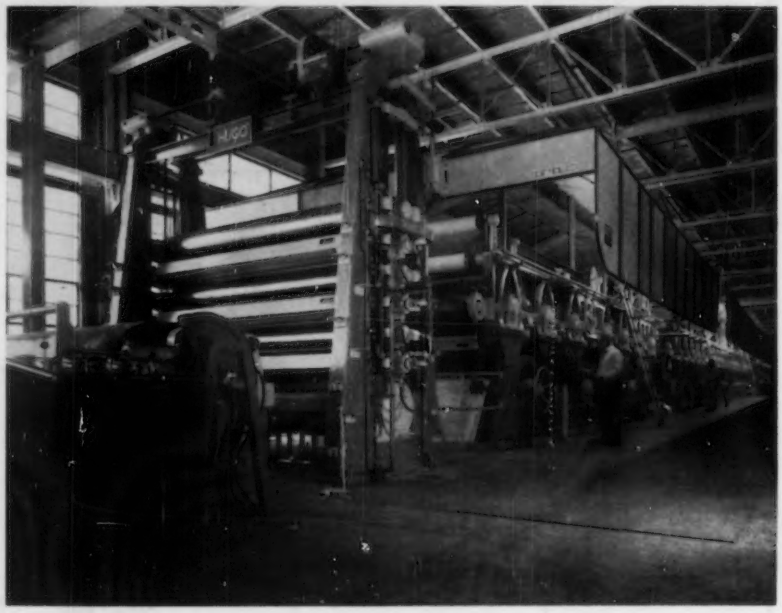
Dry broke is pulped in an 11 foot continuous type Hydrapulper equipped with a 60 inch rotor and a stainless steel wear plate. This Hydrapulper is driven by a 100 h.p. 600 r.p.m. motor. The slushed broke is pumped to a cylindrical shape tile (Stebbins) chest with a vertical all bronze agitator and is connected to a 1000 g.p.m. Shartle pump which delivers the stock either to the main Hydrapulper or the cycling chest. A Foxboro magnetic type flow meter measures the flow of broke to the main Hydrapulper. Wet broke is pumped from the





Left: Fourdrinier view. Note drive on dandy roll and on paper carrying (dance) roll.

Below: Dry end view. Autoflyte reel, calenders and dryer are conventional types.



agitated couch pit to the machine chest or alternately to the storage chest.

Excess white water from the paper machine is pumped to a tile white water tank with a 19,000 g.p.m. capacity. A 2000 g.p.m. pump supplies make-up water for the Hydrapulper or to the cycling tank. An impulse flow meter measures this flow of white water. The white water tank also supplies dilution for the DeZurik consistency regulator and where needed at the paper machine.

The stock preparation control panel contains the following instruments and meters to record data or for control of the system either automatically or manually.

Broke make-up flow controller.

No. 8 Hydrapulper broke integrator.

No. 8 Hydrapulper water integrator.

No. 8 Hydrapulper recording ammeter.

No. 8 Hydrapulper dump valve selector switch.

No. 8 cycling chest broke integrator, timer.

No. 8 cycling chest water integrator, timer.

No. 8 Hydrapulper & cycle chest distribution water valve switches.

No. 8 & 7 Hydrapulper & cycle chest broke distribution valves.

No. 8 Hydrapulper to cycle & dump chest.

No. 8 cycling chest level recorder.

No. 8 refining system timer.

No. 8 cycling chest dump valve.

No. 8 refining system control switches.

No. 8 cycling system & dump chest distribution valves.

No. 8 dump chest indicating chest level.

No. 8 broke chest indicating chest level.

No. 8—No. 1 Hydrafiner recording ammeter.

No. 8—No. 1 Hydrafiner indicating ammeter.

No. 8 — No. 1 Hydrafiner Duotrol rheostat.

No. 8—No. 1 Hydrafiner Duotrol switches.

No. 8—No. 2 Hydrafiner recording ammeter.

No. 8—No. 2 Hydrafiner indicating ammeter.

No. 8—No. 2 Hydrafiner Duotrol rheostat.

No. 8—No. 2 Hydrafiner Duotrol switches.

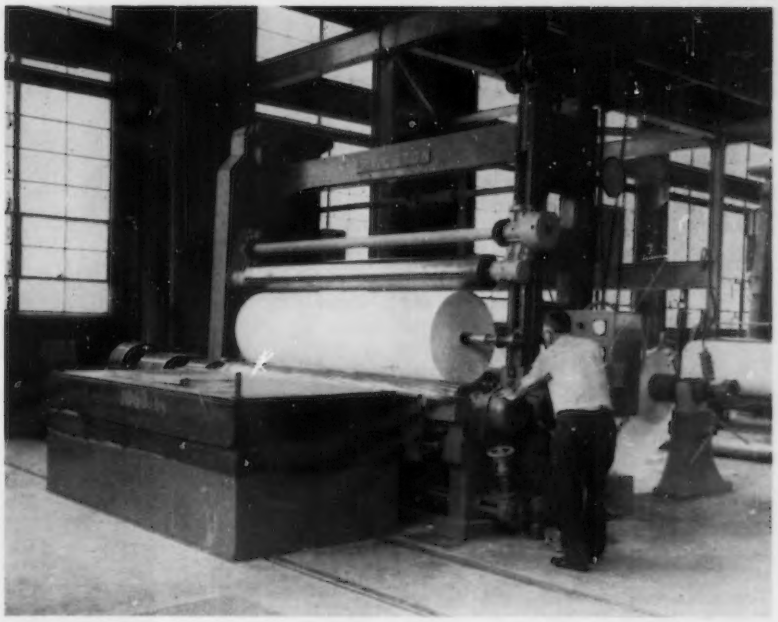
No. 8 paper machine chest level recorder.

Fourteen groups of push buttons for starting and stopping auxiliary stock preparation equipment.

No. 7 machine Hydrapulper broke integrator timer.

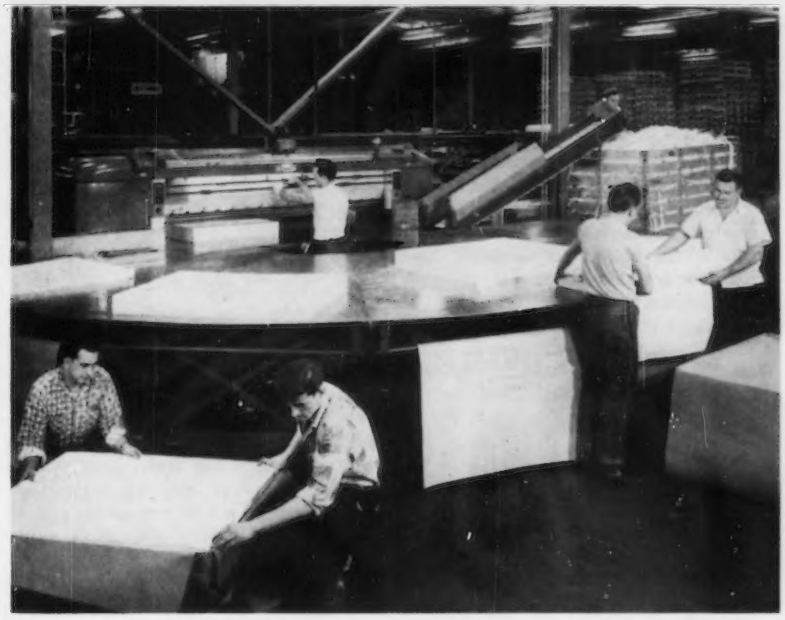
No. 7 machine Hydrapulper broke integrator.

No. 8 machine Hydrapulper broke



Right: Langston winder is 122 inch trim driven by a variable speed d.c. motor with V-belts.

Below: New automatic cutter line includes 100 inch Harris Seybold trimmer, automatic back feed and conveyors.



integrator.

No. 8 machine cycle chest broke integrator.

Fourdrinier

The paper machine, a Black-Clawson fourdrinier is equipped with a 126 inch wide wire and is designed to produce approximately 70 tons per day of bond and offset papers at speeds ranging from 400 to 1200 feet per minute. The head box is of the open type and is equipped with two perforated distributor rolls with variable speed drive and two Broughton oscillating showers. The projection type slice has an adjustable bottom lip which permits its movement closer to or farther away from the breast roll. All headbox and slice parts are of stainless steel. Dimension of rolls in the fourdrinier are: breast roll (20″ dia. x 130″ face), 24 rubber covered steel table rolls (8″ dia. x 130″ face), five rubber covered wire rolls (10″ dia. x 130″ face), bronze suction couch (32″ dia. x 130″ face) with an eight inch suction box. The breast roll is equipped with a Lodding non-oscillating doctor with a Micarta blade. The fourdrinier is equipped with ruler type deckles 10 feet long. Immediately following the breast roll is a Micarta forming board held in a stainless steel frame.

The vacuum box arrangement under the wire is as follows. Before the dandy there are two suction boxes with slotted Ryertex covers. After the dandy there are two boxes with drilled end-of-grain maple covers. These are followed by a three box Rotabelt unit 26¼ inches between centers of end rolls). Vacuum in the boxes is controlled with a Nash Hytor Vacuum pump system. Lastly there is a scavenger box with a drilled end-of-grain maple cover.

The table is equipped with a double shake, there being two separate adjustable Simplex type shake units with PIV drives. The Sinclair trunnion type dandy is driven by a separate motor. Speed of the dandy roll is controlled by placing the generator feeding the motor, on the paper machine drive line shaft. The dandy is raised and lowered pneumatically. The first wire return roll is driven from the line shaft with speed adjusted by a PIV unit.

The wire rolls are provided with Lodding oscillating doctors and Emerson self cleaning showers. The automatic wire guide is by Gilbert Nash. A Broughton knock-off shower is located on the wire after the couch for use during breaks. DeZurik squirts are used for trimming the wire on the sheet.

The wire pit is designed with a midfeather running the length of the wire and so shaped that the fan pump sump is at the front near the breast roll. There is a trash sump ahead of the fan pump sump. Excess white water overflows the fan pump sump to a foam pit

from where it is pumped to the white water tank.

The draw roll (dance roll) between the couch and first press is a 6½ inch diameter bronze tube and is driven by its own motor powered by a generator on the main drive shaft. An air cylinder raises the front bearing of the draw roll when passing paper to the first press.

Press Section

The press section includes one straight through suction first press and one reverse plain second press. The first press suction roll is rubber covered, 26 inches in diameter with a four and one half inch wide suction box. The top roll in the first press is 22 inches in diameter and of granite.

The bottom roll of the second press has a one inch thick rubber cover and is 22 inches in diameter. The top roll in this press is the same size and consists of a bronze shell on cast iron core. Top press rolls are equipped with Lodding oscillating doctors, motor driven. The top press roll is equipped with a broke conveyor. Felts have Gilbert-Nash automatic guides and Vickery (three Jordan shoe) felt conditioners hydraulically oscillated. Before the dryers there is a smoothing press with a bronze shell bottom roll and a rubber covered top roll.

There are individual Nash vacuum pumps servicing the flat boxes, couch, first press and two felt conditioners.

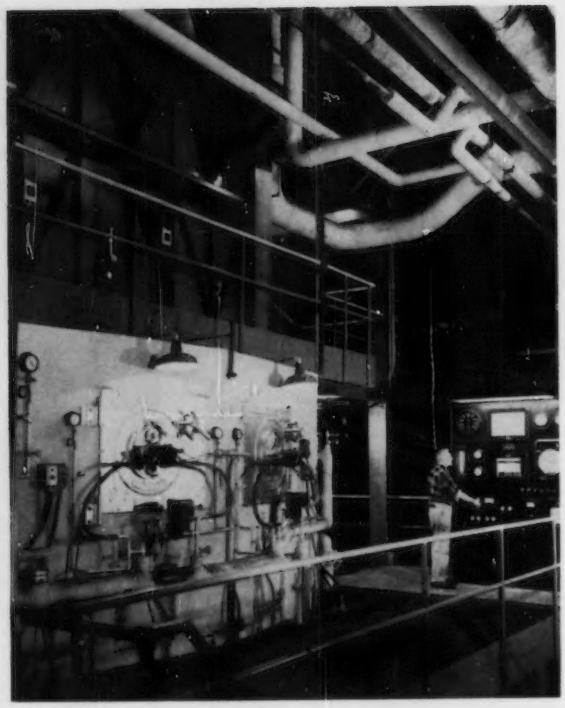
Dryer Part

The dryer section includes 53 forty-eight inch diameter paper dryers and eight felt dryers of the same size. The dryers are arranged in three section as follows: first, 20 paper dryers and 4 felt dryers; second, 20 paper dryers and 2 felt dryers; and third and last section, 13 paper dryers and two felt dryers. There is a vertical size press located between the second and third dryer sections. Both top and bottom rolls of the size press are 22 inches in diameter and rubber covered. The top press roll is driven from the bottom roll indrive shaft by V belts through a PIV unit. The first top and bottom dryers after the size press are Monel covered. Following the size press there is a hydraulically controlled Mount Hope roll.

The first three bottom dryers and the first three top dryers in the first section of 20 dryers have Vickery doctors with fuzz collectors. The first top and first bottom dryer after the size press are equipped with Lodding doctors with fuzz collectors. Dryer felts are equipped with Nash guides.

Dry End

Following the dryers is an "A" frame type air loaded, seven roll calender stack equipped with Farralloy rolls as follows: Bottom, 24 inch; Queen, 12 inch; Intermediate 12 inch (4); Top 16 inch (1). The rolls are equipped with Vickery doctors having phosphor bronze blades.



New oil fired, 900 p.s.i. boiler provides additional steam required.

The reel is Black-Clawson horizontal arm design Autoflyte reel to take rolls up to 52 inches in diameter. The reel drum is 36 inches in diameter and drilled for water cooling.

The paper machine drive is an enclosed drive unit from a main line shaft. The following units are driven from this:

Suction Couch
First Press
Second Press
Smoothing Press
First Dryer Section
Second Dryer Section
Size Press Section
Third Dryer Section
Calender Stack
Reel

Each unit, which is driven by Extremultus belts, consists of a totally enclosed case in which is installed spiral bevel gears with shafts mounted on anti friction bearings. The prime mover is a Westinghouse 900 h.p. turbine.

Paper machine hood and ventilation system were provided by Ross Engineering Co.

Condensate from the dryers is handled by a Stamm condensate removal system. Dryer temperature control is with a Stamm system, there being separate controls for the top and bottom dryers after the size press.

The machine is equipped with a Curtis-Wright fixed point basis weight measuring unit, recording only.

Reels are rewound and slit on a Langston shear cut winder handling reels up to 122 inches wide. The winder is driven by a d.c. variable speed motor powered by an M.G. set. Top speed is 3000 f.p.m. The unit includes all latest improvements such as roll ejection.

Paper Machine Erection

One of the interesting aspects of this paper machine was the way in which it was installed. Working within the existing structure, the machine was installed by a group of four contractors who performed the entire operation in the rapid time of only 59 days. They also developed a new approach to paper machine installation. Instead of working on the usual cost plus contract where the owner must assume the job of supervision and/or the cost risks involved, this job was handled on a fixed fee basis with a guaranteed maximum cost, on what is known as a saving-sharing type of contract. This approach has been widely used in certain industries by a limited number of companies with the contractor and the owner sharing in the savings and the contractor being solely responsible for any amount over the agreed maximum. This contract, new to the paper industry, has caused considerable interest and favorable comment. There were some savings to share and the guaranteed price was reasonable to begin with.

The firms involved in this unusual

arrangement were Baton Construction Corp., general contractor; Riggs-Distler & Co., Inc., electrical contractor; Nelson & Co., piping and instrumentation contractors; and George Young Co., rigging contractors. Over-all efforts were coordinated by the general contractors who worked in close cooperation with Hamilton's chief engineer, James L. Grauel; director of power and maintenance for Hamilton, John McAllister; and machine erection specialist from Black - Clawson Co., George Mercer.

Finishing Room Expansion

Increased capacity from the new machine required expansion of finishing facilities. Two new Clark-Aiken cutters for 88 and 58 inch rolls were added, complete with Stevens Counters, backstands and layboys with adjustable discharge tables for the length of the sheet. A new finishing line has been installed. This includes a 100 inch Seybold automatic trimmer, with lifts for raising skids to a conveyor which feeds the trimmer automatically, a conveyor to carry away trim and a large semi-circular air float table to handle the sheets from the trimmer. A new warehouse with 60,000 square feet of floor space is included in this project.

New Boiler Plant

This expansion required additional steam and a new Union Sterling boiler was installed. This unit, designed to burn pulverized coal or oil, has full water walls. Design pressure is 900 p.s.i. and it is rated at 60,000 lbs. per hour. The induced draft fan is variable speed turbine driven. The forced draft fan is provided with an electric motor. The boiler is equipped with a full complement of Hagan controls. The new boiler replaced two semi - automatic stoker units and also provides the additional capacity for the present expansion.

Papermaking Began Here Over Two Centuries Ago

Hamilton Paper Co. at Miquon, Pa. is perhaps best known as the mill which makes Hamilton Bond, or possibly as the largest manufacturer of text and cover papers in America. Probably not as well known is the fact that the mill is located on one of the earliest paper making sites in the nation and is only a few miles from the site of the Rittenhouse mill, the first paper mill in America, erected in 1690.

The site was first used for papermaking over 200 years ago, in 1746, when Anthony Newhouse bought a tract of 54 acres and built himself a stone barn, a dwelling house and a paper mill. His was a hand-papermaking operation of course, and he was apparently quite successful, numbering Benjamin Franklin among his customers for paper. Mr. Newhouse, in turn bought rags, glue and alum from Ben Franklin. Of interest is that Mr. Newhouse was under exclusive and confidential assignment to furnish "Money Paper" to Mr. Franklin who had been entrusted with the task of making paper money by the Assembly of Pennsylvania.

Anthony Newhouse continued the operation of his paper mill until February 1752 when he sold it for 693 pounds, more than ten times what he had paid for the property only six years previously.

The buyer, Jacob Hagey, continued to operate the mill and by 1764 had added another papermill as well as a sawmill and his own gristmill. In 1792 his son took over the business and carried on until his death in 1810. This, coupled with the advent in Europe of a papermaking machine called the fourdrinier, marked the end of hand-papermaking operations at this site.

A hand-papermaking mill on an adjoining tract of land, however, carried on operations until 1837. This mill was initially built in 1757 by an immigrant German papermaker named Nicholas Hasselbach who later moved to Baltimore, becoming its first printer and starting Maryland's first paper mill. He sold his mill on Trout Run in 1760 to Henry Katz whose descendants carried on hand-papermaking operations here until 1837.

Origin of Hamilton Mill

The holdings of the Hagey and Katz families passed into other hands in the years that followed, and it appeared that the import of inexpensive machine-made paper had doomed any further attempts at papermaking in this area. However, a Philadelphia business man, Edwin R. Cope, had different ideas and saw at Trout Run a highly desirable location for one of those new-fangled fourdrinier machines. He re-assembled the former holdings of the Hagey and Katz families, erected a paper mill and together with William C. Hamilton began production of book and writing papers in 1858. Thus Hamilton Paper was originated.

The Riverside Paper Mill, as it was called, was described at the time as follows:

"The mill is a substantial stone edifice three stories high and consists of a main building 50 by 80 feet, machine house 50 by 100 feet, an engine house 20 by 40 feet, and two boiler houses, one 24 by 42 feet, the other 27 by 32 feet."

"The machinery is all of the first class and consists of a vertical low pressure engine rating 150 horsepower, 3 flue boilers, 4 iron rag engines of the largest class, Fourdrinier paper machine, rag cutters, dusters, etc."

"About 20 hands are constantly employed and the capacity of the establishment is about 3000 pounds of paper per day, requiring in the manufacture about 4000 pounds of rags, besides chemicals of various kinds."

This was the mill of a hundred years ago. Since then it has been expanded and improved, probably experiencing some growing pains in the process. One such growing pain was the need for a larger water supply as production increased. This problem was solved when the firm secured a lease on a large spring about two miles away and constructed a water main to the mill. Called Bubbling Springs, this water supply is still used and provides water at the rate of 3000 gallons per minute at a temperature of 54 degrees the year round.

Highlights Since 1875

Other highlights of the years that followed might be:

- 1875, when the company became W. C. Hamilton & Son and had two fourdriniers, one 62-inch and one 64-inch, with a capacity of 6000 lbs. per day.
- 1884, when the Son in the company name became Sons of which there were three who carried on the business as a partnership after the death of their father.
- 1892, when a soda pulp mill was built.
- 1897, when a 112-inch fourdrinier was added and production was 50,000 lbs. per day from four machines.
- 1910, when one machine was widened and another replaced, making paper production 65,000 lbs. per day and soda pulp 30,000 lbs. per day from six rotary digesters.
- 1919, when Freas B. Snyder became president having purchased controlling interest from the Hamilton family.
- 1924, when Howard W. Taylor purchased control and became president.
- 1925, when machine room drives were electrified and production increased to 90,000 lbs. per day.

• 1928, when Hugo H. Hanson joined the company as general manager and Joseph H. Dunton was made sales manager. The soda pulp mill was shut down and dismantled.

• 1936, when Mr. Hanson became president on the passing of Howard Taylor, and Lane Taylor became vice-president.

• 1937 which marked the rebuilding and lengthening of all five paper machines.

• 1941 and 1947, when No. 6 and No. 7 machines were installed.

• 1953, when Hugo Hanson was made chairman of the board and Lane Taylor became president.

• 1954, when Michigan Paper Co. of Plainwell was purchased.

In the last 20 years Hamilton has tripled capacity, and today can produce more than 400,000 lbs. of fine papers per day. At the Michigan Division there are three fourdriniers which bring total Hamilton capacity to more than 580,000 lbs. daily.

"Hugo" Has a Christening Party

"Hugo," the paper machine, and Hugo, the man, both of Hamilton Paper Co. were honored December 9th at a party given by the contractors for the company's recently completed $5½ million expansion program. The machine "Hugo" is No. 8 at the Miquon, Pa. mill, and this was a christening party celebrating the installation of the 126-inch Black-Clawson machine.

The man, Hugo, is Hugo H. Hanson, board chairman of Hamilton Paper Co. who joined the company in 1928 as general manager and for whom the new machine was named. During the ceremonies, Lane Taylor, president, credited Mr. Hanson with being perhaps the single most important factor in building the company to its present size and position as the largest manufacturer of text and cover papers in America, as well as being a leading producer in the field of business, book, offset, and specialty papers.

Held at the Barclay Hotel in Philadelphia, the christening party was given by Baton Construction Corp., general contractor; Nelson & Co. piping and instrumentation contractor; Riggs-Distler & Co., electrical contractor; and the George Young Co., rigging contractors.

Toastmaster at the affair was H. E. Baton, Jr. Guest speaker was G. Willing Pepper, vice president of Scott Paper Co. Others who spoke in honor of the occasion were Robert O'Connor, executive secretary of APPA and Frank T. Peterson, president of Black-Clawson.

Following these speeches, Mr. Hanson acknowledged the tribute, but disclaimed credit for the accomplishments, saying instead that success was due to Lane Taylor; C. M. Connor, vice president manufacturing; J. L. Grauel, chief engineer; John MacAllister, director of power and maintenance; and George Mercer of Black-Clawson.

Armco Drainage and Construction Products

Includes data on corrugated metal pipe and pipe-arch; paved-invert pipe and pipe-arch; asbestos-bonded pipe and pipe-arch; multi-plate pipe, pipe-arch and arch; perforated pipe; water control gates; flex-beam guardrail; liner plates; bin-type retaining walls, and steel sheeting. Catalog Gen-10658. Armco Drainage & Metal Products, Inc., Middletown, Ohio.

B&W Stainless Steel Tubular Products

Contains technical data on analyses, corrosion and oxidation resistance, high and low temperature characteristics, physical and mechanical properties of the family of 18-8 stainless steels. Data Folder TDC-190. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.

Caterpillar Products

Illustrates the complete line of tractors, diesel engines, motor graders and earth-moving equipment. Also provides nomenclature and specifications. Caterpillar Tractor Co., Peoria, Ill.

Bristol Training School for Instrument Engineers and Technicians

Lists the staff and describes the five major training courses offered, in addition to special courses as the need occurs. Also includes instructions for applying for admission. Bristol Co., Waterbury 20, Conn.

Photographic Work Sampling

Explains how to use photographic work sampling to lower labor costs, improve quality and increase production. Also indicates how other companies, such as paper manufacturers can apply this approach to their own production problems. Appleton Woolen Mills, Appleton, Wis.

Truscale Remote Reading Liquid Level Gauges

Covers in detail the complete line of gauges, including standard, red flasher and inclined styles. Also includes operation and application data as well as information on accessories. Catalog 338. Jerguson Gage & Valve Co., Adams St., Burlington, Mass.

Tri-Safe Braking System

Incorporates the safety and positive control features of three completely independent brakes—a dynamic brake, power operated hydraulic brake and a mechanical brake for emergency stops and parking. Bulletin. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

The Digital Demand Recorder

Describes this impulse counting and recording device which is now proving extremely useful in production control, as well as load survey studies. Fischer & Porter Co., 828 Jacksonville Rd., Hatboro, Pa.

Heat Transfer Equipment

Contains product information and selection data for storage water heaters and heat exchangers. Also annotates catalog information available for specific types of heat exchange equipment. Bulletin 123-6. Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

Ingersoll-Rand "K" Line Motor Pumps

Outlines twenty sizes of "K" line motor-pumps that are readily available "off-the-shelf." Drawings pinpoint the outstanding features and tables give the dimensions. Bulletin 70022. Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

I-T-E 4160 Volt Metal-Clad Switchgear

Covers complete line of indoor, and standard and walk-in outdoor type equipment with ratings through 3000 amperes continuous-current and 350-mva interrupting capacities. Bulletin 2804. I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.

Waldron Web Process Engineering

Acquaints converters of paper, plastics, metals, textiles and rubber with the broad scope of Waldron service in connection with projects involving coating, saturating, laminating, printing or embossing operations on typical finished products. Catalog 10. John Waldron Corp., P. O. Box 791, New Brunswick, N. J.

Dependable Power in Northern Logging

Points out that maximum profit on rugged logging jobs requires the best in men, methods and machines. Form D863. Advertising Div., Caterpillar Tractor Co., Peoria, Ill.

OBITUARIES

Thomas J. Mussio, 54, owner of King Manufacturing Co., bag manufacturer, died at his residence Dec. 5.

Mr. Mussio had suffered from a kidney ailment for the past two years. A native of Cincinnati, he was a graduate of Xavier University.

Hiram C. Ballard, 79, of Penn Yan, N. Y., one of the last area veterans of the Spanish American War, and a sales representative for the Alling and Cory Co., large paper wholesalers and distributors. He had been the area representative for Alling and Cory for over 30 years.

William H. Enell, director of advertising and public relations, Paterson Parchment Paper Company, Bristol, Pennsylvania died November 26. He had suffered a coronary occlusion on October 31st. Mr. Enell, with Paterson since 1927, was active in many affairs of the paper business. His loss will be felt deeply throughout the industry.

William Henry Wharton, former chief engineer and consultant of the Howard Smith Paper Mills, died on Nov. 29.

In private practice from 1924 to 1940, he was made chief engineer of the Howard Smith Paper Mills in 1944 and held that position for 11 years.

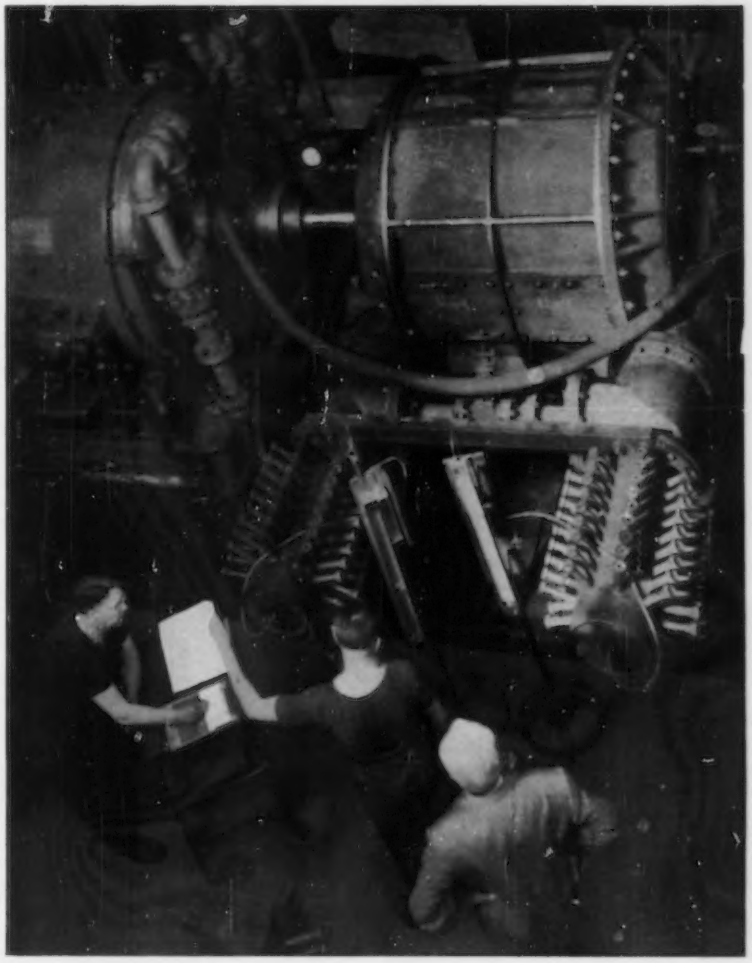
Correcting Calculation of Couch Draw

An error in the article "Behavior of Sheet at the Open Draw Between Couch and Fast Press" by E. J. Cole, which appeared in our June 30, 1958 issue has been drawn to our attention. Mr. Cole in commenting on the error stated:

"My error in the above article has been pointed out, the radial component of the tension should be S sinΦ and not S cosΦ as stated.

This correction is made in the interest of completeness of presentation. The whole treatment has now, however, been superseded by that of Mardon, Truman, O'Blenes and Meadley, Pulp & Paper Magazine of Canada September 1958, where S is shown as equivalent to $\frac{W}{1-\sin\Theta}$ **or proportional to** $\frac{W}{1-\cos\Phi}$ **if the speed dependent term is neglected; this gives a much steeper rate of increase of S with decrease of angle than the Figure 2 of Cole's note."**

Rated performance of every Nash Vacuum Pump is assured by this precise laboratory test

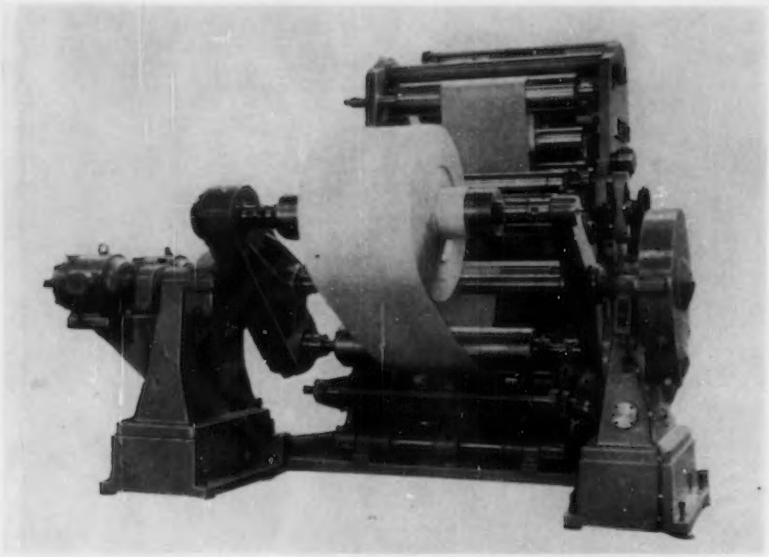


Rated capacities of Nash Vacuum Pumps are not theoretical. Every Nash Pump is tested individually. Air capacity is determined by delivery thru accurately machined and calibrated orifices. Related vacuum is measured by precise mercury column, and horse power is recorded electro-dynamically. Records of these tests are retained by us, and certified copies are available to Nash Pump owners.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

440 WILSON ROAD, SO. NORWALK, CONN.



Rotogravure Press Features

A new turnover type center rewind with electronic web tension control is now standard equipment on the "Model America" Cerutti rotogravure press. Designed as companion equipment to the Cerutti electronically controlled duplex turnover unwind, the new rewind as well as the unwind unit features semi-automatic flying splicer. With electronic web tension control at both ends of the "Model America." Cerutti provides accurate metering of the web to the press . . . and precisely controlled delivery of the printed web to the rewind mechanism.

The electronic web tension control is of Cerutti's own design and is said to be extremely accurate and sensitive in its response on all materials—from cellophane to light board. The device continually compensates for the build-up in the roll, maintaining the exact degree of predetermined hardness. The new unit rewinds webs from 32 inches to 55 inches wide, in roll diameters up to 31½ inches. The rewind splices at speeds to 1,000 f.p.m., the unwind, to 500 f.p.m. Further information may be obtained from the distributor for this equipment, Parsons & Whittemore Graphic Corp., 250 Park Ave., New York 17, N. Y.

Integral Gearmotor Line Announced

Allis-Chalmers has recently announced the addition of a new line of integral gearmotors in both the concentric shaft and right angle types for integral horsepower motors through 100 horsepower. Also announced for the first time, is a line of fractional horsepower integral type right angle gearmotors. The new integral units are available with either open or totally enclosed motors, double and triple reduction in standard ratios.

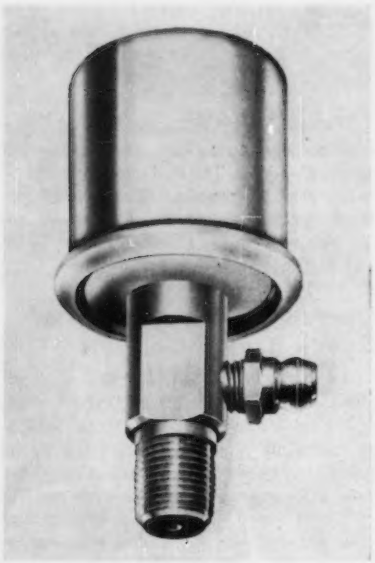
A one piece, corrosion resistant cast iron housing and rabbet-fit motor flange in the integral gear motors assure positive alignment of the motor and gears regardless of mounting position. Ratio changes are simplified through use of only one low-speed gear set for each drive size. The gear system has a minimum of moving parts to provide a compact, quiet operating unit.

For more information write Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

New Bearing Lubricator Injects Grease as Needed

A new, low-cost automatic bearing lubricator that holds a reservoir of lubricant and automatically injects grease only as needed is announced by Anchor Chemical Co. The position of the pressure cup on the unit signals at a glance the amount of grease remaining in the reservoir.

The new automatic lubricator, measuring 2¼ inches long x 1⅛ inches in diameter, is installed one to each bearing by simply removing the old fitting and screwing the automaic lubricator into place. The automatic lubricator will operate in any position and can be mounted in cramped positions with standard adapter fittings. The new lubricator is filled by any standard grease gun. The combination of bearing vacuum and spring pressure in the lubricator discharges only enough grease to replace the amount used in the bearing and positively eliminates bearing burnout and over or under lubrication.



Among the advantages claimed for the new device are elimination of downtime for lubrication; prevention of bearing burnout by maintaining a constant reservoir of grease at the bearing; automatic signalling when grease reservoir refill is needed; provision for a simple automatic lubricating program for every size plant; prevention of grease drip or run-off in critical consumer industries; saving of 75 to 90 per cent of presently required lubrication time. The new automatic lubricators sell at $18.25 per dozen. Complete descriptive literature is available from Anchor Chemical Co., 10723 Briggs Road, Cleveland 11, Ohio.

New Transmission Increases Lift Truck Efficiency

Hyster Co., announces a new two-speed, power shifted Hystamatic transmission as optional equipment for the new Challenger 60, 70, and 80 pneumatic-tire lift trucks in the 6000-8000 pound capacity range. The new transmission is a hydraulically shifted, constant mesh unit with integral torque converter. The two-speed ranges forward and two in reverse are operator selected by means of levers. All components are confined in a single housing mounted to the engine as an integral part of the power train. Simple movement of selection levers hydraulically shifts the transmission into forward or reverse, high or low range. The torque converter automatically adjusts power output to fit road and load conditions within each range. As a result, the engine runs at its most efficient speed, reducing engine wear and prolonging engine life. Action of torque converter absorbs shock loads on shafts, bearings, gears, and axles, extends truck life. Forward-reverse power shift permits effortless "on the fly" change of direction.

For additional information contact your nearest Hyster industrial truck dealer or write to Hyster Company, 1003 Myers Street, Danville, Illinois.

Line Strainers Offer Many Features

Spraying Systems Co. has greatly expanded its range of line strainer capacities and choice of materials. Strainers are now supplied in a complete range of threaded pipe connection sizes from ¼ inch to 4 inches, and with flanged connections for 3 inch, 4 inch and 6 inch pipe sizes. In addition all strainers are now available in stainless steel as well as in brass and cast iron. Screen areas for each size are unusually large. Each strainer can take up to 75 per cent blocking with less than ½ lb. pressure drop under normal flow conditions.

Dual screen design gives a heavy outside screen to protect against surge and bursting and a fine-mesh inside screen for straining. Screens are supported top and bottom by flange collars to provide seal fit and rigidity. Strainers are easily flushed. Larger capacity strainers equipped with top outlet for gauge mounting. Also included are special line strainers for high pressure lines up to 5,000 p.s.i. For complete information write for Bulletin 94 to Spraying Systems Co., 3220 Randolph Street, Bellwood, Ill.

New Pump Handle Wide Range of Temperatures

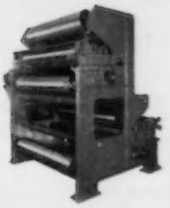
Ingersoll-Rand has introduced a new line of heavy-duty, medium-temperature process pumps, class SFLM, for handling temperatures to 300°F. and for pressures to 600 p.s.i.g. The pumps are vertically-split, single-stage, single-suction units with overhung impellers. Capacities range up to 1400 g.p.m., heads to 650 feet and discharge diameters are available in sizes of 1 to 4 inches.

According to the manufacturer, the SFLM pumps are ideal for a wide range of low and medium temperature applications where water-cooling of the stuffing box and bearings is unnecessary. Because of the pumps' versatile design, conversion to water-cooled operation is simple and inexpensive. All parts are completely interchangeable with Ingersoll-Rand's companion line of SFL water-cooled units.

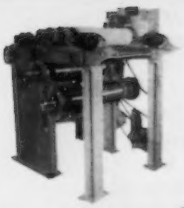
For more information write Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

Gurley Densometer now available with automatic timing device is shown above. Unusually porous materials can be tested by use of a 5 oz. inner cylinder and by interchangeable clamp plates. For full details write W. & L. E. Gurley, Troy, N. Y.

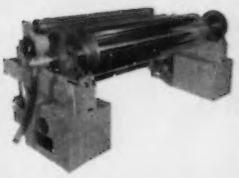
Dilts
LAMINATORS



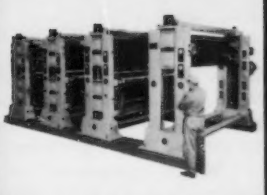
LINING—3-PLY



FOIL



POLYETHYLENE



BOARD—5-PLY

Write or phone for full information

THE
BLACK-CLAWSON
COMPANY
DILTS DIVISION
Fulton, N. Y. • LYric 2-4265

NEWS OF SUPPLIERS

G. E. Pehrson

Graver Water Conditioning Co., division of Union Tank Car Co., N. Y., have named Garth E. Pehrson, sales engineer for the Chicago district office. Mr. Pehrson will handle Graver's complete line of equipment for industrial and municipal water treatment, industrial waste treatment and chemical processing. The Chicago Office is at 228 North La Salle Street, Room 1615,

Mr. Pehrson is a liquid treatment engineer with wide experience in the practical and theoretical aspects of equipment design, application and operation. Prior to his appointment he was a process engineer in Graver sales department for two years. Before that he was a member of the service department for three years.

F. P. Houpt

Fischer & Porter Co., manufacturers of flowmeters, instruments, chlorinators, automation equipment, and glass products, announces the appointment of Frank P. Houpt as manager of their newly-created Systems Application Engineering department.

In his new position, Mr. Houpt will be responsible for the direction of the systems engineers and for planning and coordinating the company's systems program for the process and missiles industries. Formerly manager of Application Engineering, he has been with F&P for thirteen years.

Mr. Houpt attended Duke and Columbia Universities and is a member of the Instrument Society of America and The American Rocket Society.

Allis-Chalmers Manufacturing Co., has appointed Wainwright Holt, Jr. as sales manager of centrifugal and axial compressors. Mr. Holt joined Allis-Chalmers in 1951 and had been a representative for petroleum and chemical sales in the New York district since that time. He is a graduate of Dartmouth College and in 1954 served as president of the New York Chapter of the Power Transmission Council.

Joseph T. Ryerson & Son, Inc., nation-wide steel distributing subsidiary of Inland Steel Co., has entered Texas for the first time by acquiring the Dallas and Houston plants and stocks of Vinson Steel and Aluminum Co., big steel and aluminum distributor in that area. The transaction, announced jointly today by Joseph L. Block, president of Inland and chairman of Ryerson, and Charles L. Hardy, Ryerson president, was accomplished by an exchange of stock of undisclosed amount.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

1958	Nov. 8 91.5	Nov. 15 91.5	Nov. 22 91.7	Nov. 29 86.5r	Dec. 6 90.3
1957	Nov. 9 91.1	Nov. 16 91.9	Nov. 23 92.7	Nov. 30 87.0	Dec. 7 91.1

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	86.9	89.5	89.5	88.4	86.4‡	86.2‡	76.0‡	89.8‡	86.7‡	91.4‡	90.3‡	—	—
1957	94.2	97.0	97.1	94.0	94.6	93.3	75.6	90.7	86.0	93.0	90.7	81.5	90.9

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1951	1952	1953	1954	1955	1956	1957	1958
Year to Date	99.6	90.7	93.7	92.3	95.9	98.5	91.1	86.9
Year Average	98.0	88.6	92.3	91.6	94.0	97.9	90.9	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

1958	Nov. 8 93	Nov. 15 94	Nov. 22 94	Nov. 29 88	Dec. 6 84
1957	Nov. 9 94	Nov. 16 94	Nov. 23 94	Nov. 30 86	Dec. 7 84

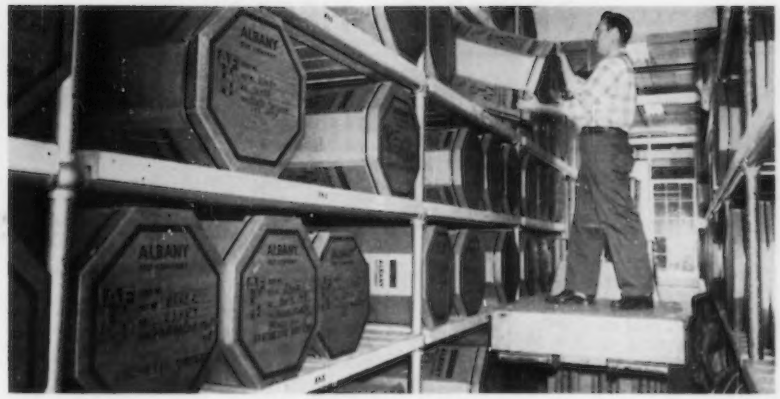
COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1958	80	86	88	84	84	86	76	93	90	95	92	—	—
1957	91	94	94	92	93	91	73	94	91	97	92	79	90

† *Percents of operation based on "Inch-Hours" reported on a 6-day basis.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Dec. 6, 1958	LAST WEEK ENDING Nov. 29, 1958	CUMULATIVE TO DATE Jan. 1 to Dec. 6, 1958
% Activity	84%	88%	87%
TOTAL	277,282	286,263	13,350,807
Liner	96,330	99,307	4,496,335
Corrugating Material	43,519	44,662	2,022,629
Chip & Filler Board	4,028	4,385	233,641
Total Containerboard	143,877	148,354	6,752,605
Folding	48,366	50,176	2,528,003
Set-Up	11,450	11,644	533,125
Special Food Board	23,518	24,894	1,229,440
Other	50,071	51,195	2,307,634
Total Boxboard	133,405	137,909	6,589,202
TOTAL ORDERS			
Received	344,015	259,412	
Unfilled End of Week	438,091	369,636	



Felts packaged in new corrugated carton are easy to handle and store. New container also provides much better protection against moths, water and rough handling.

Albany Felt Co. announces that the new corrugated container for the shipment of papermakers' felts, introduced early this year, has been an outstanding success. As an indication of its Albany reports approximately 70 per cent of their felts are now being shipped in the new containers. The containers are said to give better protection to the felts and have greatly simplified their handling in paper mills.

Since Albany Felt manufactures felts for all positions on all types of machines, several sizes of cartons were required. Experimentation revealed five would accommodate the majority of felts produced. Separate interlocking covers are used for the top and bottom of the box, in order to failitate packing and removal of felts. In assembly, the interlocking bottom cover is fitted on and a steel strap applied to hold it rigidly in place. The felts are folded to fit the depth of the carton, rolled and slipped in, or the carton is slipped down over the felt and then upended. The top cover is similarly strapped on using a pneumatic strapping machine to assure proper tension.

H. Van Schaik

Whiting Corp., Harvey, Ill., Gilbert H. Van Schaik officially assumed the duties of manager of the Chicago District Office November 1. A. M. Truc, sales manager, made the announcement. Mr. Van Schaik, who formerly was sales engineer at the Chicago office, succeeds the now retired R. S. Hammond.

Mr. Van Schaik came to Whiting Corporation in 1936 as a draftsman. He took a leave of absence in 1939 to complete his education at the University of Michigan and, shortly after graduation as a mechanical engineer, he entered the armed forces. He left the Army with the rank of major in 1946 and returned to Whiting as a sales engineer in the Crane Department. He was transferred to the Chicago Office in 1947 as a salesman.

Allis-Chalmers Industries Group, announces the transfer of James C. Breth from the Chattanooga to the Tampa district and of Evan F. Reynolds, Jr. from the Kansas City to St. Louis district.

Mr. Breth was an application engineer at Allis-Chalmers Pittsburgh Works for 11 years before being transferred in 1957 to the Chattanooga district as a sales representative.

Mr. Reynolds had been a sales representative in the Kansas City district since 1956.

Perkins-Goodwin Co., internationally known pulp and paper marketing-management organization, announces that effective January 1, 1959, John Quackenbush will become manager of the Chicago office.

Since joining Perkins-Goodwin Co. in 1948 Mr. Quackenbush has represented the company in the middle western territory.

Texas Gulf Sulphur Co., New York, N. Y., announces the appointment of W. B. Gillette and Bryan W. Guess as assistant sales managers.

always in the market

baltimore
chicago
detroit
jersey city
kalamazoo
los angeles
oakland
philadelphia

PIONEER PAPER STOCK COMPANY

graders and packers of waste paper

Alvin H. Johnson & Co.

INCORPORATED

Consulting and Designing Paper Mill Engineers

415 LEXINGTON AVENUE NEW YORK 17, N. Y.

PAPER MILL DESIGN PROCESS ENGINEERING POWER PLANTS

STRUCTURAL AND ARCHITECTURAL DESIGN

REPORTS APPRAISALS ESTIMATES AND SURVEYS

CHAS. T. MAIN, INC.
ENGINEERS

Process Studies, Design, Specifications and Construction Supervision

PULP AND PAPER MILLS

Steam, Hydraulic and Electrical Engineering Reports, Consultation and Valuations

80 Federal Street Boston 10, Mass.

Design · Construction · Modernization

THE RUST ENGINEERING CO.
930 FORT DUQUESNE BLVD.
PITTSBURGH 22, PA.

BIRMINGHAM NEW YORK

LOCKWOOD GREENE
ENGINEERS

Site Investigations, Design and Construction Supervision

PULP AND PAPER MILLS

Steam, Electrical, Water, Waste Reports, Appraisals

MONTGOMERY BLDG. SPARTANBURG, S.C.
NEW YORK BOSTON

Serving Timber Industry since 1910

Timber Estimators and Foresters

C. D. SHY & COMPANY
1130 Commerce Title Building
Memphis 3, Tennessee

PRICES OF FIBERS

MARKET WOOD PULP

FOURTH QUARTER CONTRACT PRICES PER SHORT AIR-DRY TON

Delivered Basis

	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$ 82.50/ 90.00	$ 82.50/ 90.00	§$90.00/ —	§$80.00/ —	§$90.00/ —
Bleached Gw'd	$ 97.50/100.00	$ 97.50/100.00			
Kraft, Blchd.	157.00/ —	160.00/162.50	$157.00/162.50*		$157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		$137.00/ —		
Kraft, Semi-bleached	140.00/ —	140.00/ —			
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	155.00/ —	155.00/ —	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
Sulphite, Unb't. Gl'sn		134.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

§ On Dock Atlantic Ports. * Freight allowed. † Varying Freight Allowances

COTTON LINTERS

F.O.B. OIL MILLS
WEEK ENDED DEC. 9

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	$8.75/7.50	7.40/7.15
3	$8.00/7.00	$7.75/6.00	7.25/6.75	6.90/6.65
4	7.00/6.00	5.75/5.50	6.25/5.75	6.15/5.90
5	6.00/5.50	5.00/4.75	5.50/5.00	5.25/5.00
6	5.50/4.00	4.25/4.00	4.50/4.25	4.50/4.00
7	4.00/3.00	3.50/3.25	4.00/3.00	2.75/2.50

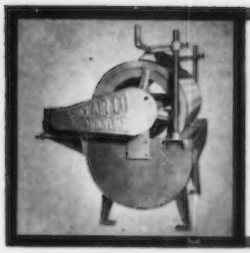
WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	Dec. 15	Dec. 15	Dec.	Dec.
No. 1 Mixed Paper	$10.00/ 11.00	8.00/ 10.00	9.00/ —	14.00/ 15.00
No. 1 News	14.00/ 15.00	15.00/ —	20.00/ —	17.00/ 18.00
Overissue News (Lg. size)	16.00/ 18.00	12.00/ 14.00	25.00/ —	22.00/ —
Mill Wrappers	19.00/ 22.00	13.00/ 15.00	12.00/ —	15.00/ —
Old Corrugated Containers	24.00/ 25.00	23.50/ 24.00	25.00/ —	25.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	35.00/ 40.00	35.00/ —	55.00/ 57.50
New Double Kr. Ld. Corr. Cuts	35.00/ 37.50	37.50/ 40.00	37.50/ —	35.00/ 37.00
(Semi-chem. medium)	37.50/ 47.50	45.00/ 50.00	45.00/ 50.00	35.00/ 36.00
New 100% Kraft Corr. Cuts	40.00/ 42.50	50.00/ 55.00	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	55.00/ 57.00
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	52.50/ —	55.00/ 58.00
New Br. Kr. Bag Waste Unpriatd	60.00/ 65.00	65.00/ 75.00	62.50/ —	58.00/ 60.00
No. 1 Groundwood Shvs.	25.00/ 30.00	22.50/ 27.50	22.00/ —	35.00/ 42.00
White Newsblanks	60.00/ 65.00	50.00/ 57.50	45.00/ —	55.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	60.00/ 65.00	55.00/ —	67.00/ 70.00
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	65.00/ —	— / —
Hd. White Shvs.	90.00/ 95.00	95.00/105.00	85.00/ —	95.00/ 97.00
Hd. White Env. Cuts	105.00/110.00	110.00/115.00	90.00/ —	113.00/ —
Col. Tab. Cards	55.00/ 60.00	60.00/ 67.00	52.50/ —	38.00/ 42.00
Manila Tab. Cards	75.00/ 80.00	75.00/ 85.00	75.00/ —	65.00/ —
No. 1 Col. Ledger	32.50/ 37.50	25.00/ 30.00	45.00/ —	29.00/ 35.00
White Ledger	60.00/ 62.50	57.50/ 62.50	57.50/ —	50.00/ 55.00
Mixed Book & Mag.†	20.00/ 23.00	18.00/ 20.00	14.50/ —	— / —
No. 1 Books‡	25.00/ 30.00	20.00/ 22.00	32.50/ —	14.50/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.



SINCLAIR'S Self-Cleaning SIZE STRAINER

No finer **STRAINER** *made . . .*

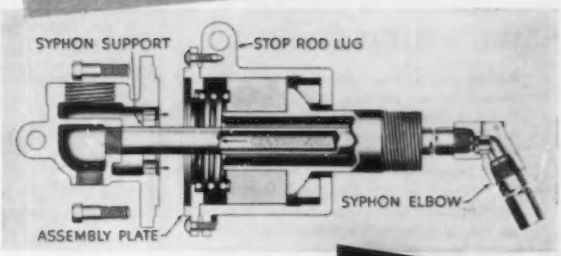
Removes hair, slugs and other unwanted foreign materials continuously. Completely self-cleaning. Available in 40 GPM and 100 GPM capacities. Like all other Sinclair products, our size strainers have all the built-in quality features you need to do your jobs the way they should be done.

FOR SPECIAL SERVICES, ***Call our Customer Service Department. They are always ready to Serve You.***

THE SINCLAIR COMPANY
61 APPLETON ST., HOLYOKE, MASS.
JEfferson 2-9488

The right rotary joint for every need!

. . . ON PAPER MACHINE DRYERS
. . . CORRUGATORS
. . . CALENDERS
. . . ROOFING MACHINES
. . . WAXERS
. . . EMBOSSERS
. . . PRINTING PRESSES



Type "SBP" shown is completely self-supporting. Like all Johnson Joints it has no packing, needs no lubrication or adjustment. The syphon elbow replaces unwieldy curved condensate drainage pipes with two straight pipes, hinges to pass right through the joint. Write for Bulletin S-3002. Johnson Rotary Pressure Joints are available for all operating speeds, pressures, mountings.

Johnson ROTARY PRESSURE Joints *First in the Paper Industry*

THE JOHNSON CORPORATION
828 Wood St., Three Rivers, Mich.

Concrete Gravity Air-Water-Wash type water Filtration Plant producing, at low cost, water with turbidity 0, color under 5 and iron 0.05 p.p.m. Fe.

OTHER PRODUCTS

Demineralizing Plants
Water Softening Plants
Pressure Filter Plants

and

All other types of water treating systems, including strainer valves, air wash systems, filter sand and anthracite beds and all filter repair and replacement parts. Over 50 years experience building new and modernizing old water treatment plants.

Write for FREE Bulletins

HUNGERFORD & TERRY, INC.
CLAYTON 4, NEW JERSEY

Westvaco Quality Papers

Westvaco manufactures its products from virgin chemical pulps, and carefully maintains precise uniformity and quality standards . . . your assurance of top performance.

Printing Papers . . . Coated and uncoated letterpress, offset and gravure.

Writings . . . Bond, mimeo, duplicating, ledger and multipress.

Bristols . . . Uncoated index and postcard, coated two sides and coated one side board.

Label and Lining Papers . . . Coated and uncoated letterpress, offset and gravure, coated washproof for letterpress and gravure.

Converting Papers . . . Envelope, tablet, drawing, coating raw stock, register bond, lace, and place mat.

Bleached Boards . . . Cup, coated and uncoated carton board, frozen food container, milk bottle, file folder and tag.

Kraft Papers . . . Bag, multiwall sack, envelope, asphalting, impregnating, waxing, and new CLUPAK* stretchable paper.

Containerboard . . . Linerboard and corrugating medium.

Market Pulp . . . Bleached and unbleached sulphate.

**CLUPAK, Inc's. trademark for extensible paper, manufactured under its authority.*

West Virginia Pulp and Paper Company
230 Park Avenue, New York 17, N. Y.

PAPER TRADE JOURNAL CLEARING HOUSE

Help Wanted

PAPER MEN

$5,000 to $50,000

SALES • PRODUCTION • TECHNICAL

Finding and landing **THE ONE BEST JOB** requires sound analysis, careful planning, proper contacts and skillful negotiation. Paper men ourselves, and the only specialists in the world in our particular field, we assist responsible paper men to accelerate their careers by uncovering and developing **THE SPECIFIC SITUATION** that most exactly fits the needs of each individual we serve. If you seek to better yourself, and your performance to date entitles you to our endorsement, we can and will help you. Contact us in absolute confidence for information regarding procedure.

GEO. M. SUNDAY & ASSO.

PAPER PERSONNEL CONSULTANTS

6 E. Monroe Chicago ANdover 3-1970

PAPER CONVERTING MACHINERY DESIGNER

Wanted by manufacturer of paper and film bag machinery and printing presses.

Located in pleasant New Jersey community.

Degree not necessary—only the ability and practical background for independent design of converting machinery.

Excellent opportunity for capable man. Salary open.

Please send resume of experience. Box 58-13 care Paper Trade Journal.

TF

MASTER MECHANIC

A paperboard manufacturing plant of a large national organization seeks a master mechanic with a practical background in all phases of paper mill maintenance. Must be an ambitious, capable supervisor. Mill located in suburban New Jersey area. Please send resume including salary requirement to Box 58-305 care Paper Trade Journal. D-22

MACHINE TENDER

For Fourdrinier machine running towel and napkin grade paper in our Bloomfield, N. J. plant. Must be willing to work rotating shift. Reply promptly stating details of age, experience, and wages expected to Box 58-325 care Paper Trade Journal. J-5

Help Wanted

Personnel Service Associates
115 State St., Springfield 3, Mass.
Tel. RE 6-4749
Personnel Consultants
H. M. Grasseit, Manager

Offering a Comprehensive and Confidential Placement Service to Employers and Employees in the Pulp, Paper, Converting and related Industries

Administrative—Technical—Sales—Production and Process Personnel D-22

WANTED

Recent graduate with science or engineering degree and few years experience in paper industry. We present a challenging opportunity to work with all phases of paper manufacture and conversion. As part of the research team of a leading supplier to the industry, the man who fills this newly created position will evaluate new products, supervise field testing and generally advise with management with respect to his field.

If you have a feel for the needs of the paper industry and would like to apply your ingenuity and imagineering in an Eastern laboratory write us in strictest confidence. Please give full details and desires in first letter, so that an interview may be arranged. Address Box 58-321 care Paper Trade Journal. J-5

ENGINEERS

Excellent career opportunities for graduate mechanical engineers at our International Falls, Minnesota plant. Two to five years experience in paper mill or related work desirable. These positions also offer extensive medical coverage, a retirement program and life insurance benefits all paid for by the company.

Your reply giving personal, educational and work backgrounds will be kept in strict confidence.

Write Don Lindert, Minnesota and Ontario Paper Co., 500 Investors Bldg., Minneapolis 2, Minn. J-5

WANTED

TOUR BOSSES
MACHINE TENDERS
MILLWRIGHTS
One Machine Board Mill.
Phone: Lancaster, Pa.
EXpress 4-4832 tf

Buy U. S. Savings Bonds

GIBBS-BROWER CO., INC.

10 Depot Plaza, White Plains, New York
Telephone—Rockwell 1-1130

Mid-West Branch:
400 Washington Building
Madison 3, Wisconsin

West Coast Branch:
5270 East Washington Blvd.
Los Angeles 22, Calif.

Canadian Branch:
903 Danforth Place
Burlington, Ontario

HAVE AVAILABLE:

PRINTING PRESSES

1—65" 6-Color Kidder Master Anilner
1—54" 1-color Rotogravure Press
1—49" 1-color Rotogravure Press
2—41½" 4-color Hudson Sharp Flexo Presses
1—40" 4-color Hudson Sharp Flexo, Roll to Sheets
1—40" 3-color Kohlback Flexo Press
2—36" 4 & 5 color P. W. Wolverine Hydro Presses
1—36" 4 color Schmutz Hand-Fed Bag Press
1—36" 2 color Champlain Gravure Press
1—36" 5 color Koenig & Bauer Rotogravure
1—30" 4 color Hudson Sharp Flexographic Press
1—24" 5 color Kidder Celloprinter
1—24" 3-color Rotogravure Press
1—18" 2 color Potdevin (Model - 217) Roll to Roll Press
2—9" x 12" & 2—12" x 12" New Era Presses

TAILPRINTERS

1—30" 5-color Gregg Flexo Press
1—16" 2-color Potdevin.

POWER PAPER CUTTERS

Seybolds: 1—44" late model Seybold Model P4460 New 1952
Precision: 40", 50", 57" & 64"; 10Z: 40", 57" & 65"; 20th Century: 45", 54" & 60"; Dayton (6Z): 35", 40" & 84"; Holyoke: 65"; Sheridan: 36" new model, 55"; Oswegos: 38" & 44" & 34", 54" Heavy Duty; Lawson: 52" Auto Space & 52" Standard.

CAMACHINES

1—72"—10-04 8 Shear Cut.
1—66" & 2—52" 9-5.
1—62" 10-10
1—62" 26-2A with 100 score cutting units
1—62"—40—1—AF
1—52", & 1—42", Model 24-7.
1—42" Type 9-5-A Roller Bearing 1500 fpm.
1—42" Cameron 26-7M Duplex
1—42", 1—52" and 2—62" Type 6

OTHER SLITTERS

1—82" Langston Type—B
1—60" Langston Type A.
1—50" Kidder Junior Model Superspeed (IBM Type Tab Card Slitter)
1—45" Ruf Duplex Winder.
1—42" Kidder Merchant Model
30" Fales Model—B Slitter and Rewinder
2—24", 1—30", 1—36" & 1—40" Kidder S.L. Shear cut

MISCELLANEOUS MACHINES

1—46" Reverse Roll Coater
1—48" Hot Melt Coated and Laminator
1—40" and 1—48" Asphalt Laminators.
1—60" Hot Melt Coaters & laminators
1—90" Duplex Hamblet, Layboy and Back Stands
10—Hamblet Sheeters 32", 42", 45", 50", 62", 68", 72", 84", 90" and 104"
1—30" Peters Sheeter, Model UD.
1—45" Beck Auto-Piler
4—Schultz continuous roll winders. Two—12", One 18" and 1—48".
1—Potdevin Model 224 Garment Bag Machine, 2 color printing, large range.
1—Potdevin Model 72—C Cellophane satchel bottom bag machine
1—Potdevin Model 296 Duplex Coffee Bag Machine
1—Weber Model "CN" Cellophane Satchel Bottom Bag Machine
1—Simplex Model 4-7 Cellophane Bag Machine
Die Presses: 1—60" x 14" Seeley. 1—50" x 33" Sheridan. 2—37" x 18" Sheridans and 2—Hobbs Mfg. Co. 44" x 30" & 44" x 38"
1—9-roll Holyoke Super Calender with drive
3—Waldron Gummed Paper Breakers 50", 56" & 66"
1—Hayssen 4-roll Toilet Roll Wrapper
1—Hayssen Model 5-9 Cellophane Wrapper
1—50" Hudson Sharp Embosser-tinter.
1—48" Unicraft Embosser
1—18" Waldron Embosser
1—30" Double Reverse Roll Coater
1—MD Knowlton Core Winder. Range ¾"-8" diameter
1—Vierengel Tin Tie Machine D-22

FOR SALE

BEATERS
2—1500 lb. rag beaters. Valley Iron, bandless rolls, 54″ x 48″, cast iron tubs

CALENDER STACKS
1—3 roll 84″ calender stack.
1—4 roll 72″ Calender Stack. (Extra heavy duty).
1—5 roll 82″ face.
1—5 roll 86″.
1—7 roll, 84″ face.

CHIPPERS
1—96″ Murray 4 knife Chipper—anti-friction bearings.
1—84″ 10 knife Carthage Chipper. Anti-friction bearings.
24—Chipper Knives 15⅞ x 8¼, 2 slot.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.
1—Williams Hammermill

CYLINDER MOLDS
2—42″ diameter x 106″ face
8—36″ diameter x 94″ face, hollow shafts, Very good condition.
1—30″ diameter x 72″ face.
1—30″ diameter x 92″ face.
1—36″ diameter x 84″ face
2—36″ dia. x 54″ face.
3—36″ diameter x 90″ face, 18″ diameter couch rolls.
1—60″ dia. x 170″ face.

DIGESTER
1—Biggs 12′ 6″. (Globe)

DISINTEGRATOR
1—Shartle 8″ disintegrator (new) with 125 horsepower induction motor (totally enclosed)

DRIVES
1—Rice-Barton hypoid enclosed drive, 4 to 1 ratio.
1—#6 Reeves vertical—anti friction bearings, totally enclosed.
1—Sandy Hill right angle 50 H.P. (4.75 to 1).
1—Jones 21 H.P., ratio 10 to 1 (enclosed angle drive)
1—#4 Reeves Drive
2—Waterbury Hydraulic Variable speed line shaft drives (from 40 to 100 H.P.)
1—Beloit hypoid enclosed drive 60 h.p. 5 to 1 ratio.
1—5 H.P. Reliance Drive, complete with starting equipment, like new.
1—20 H. P. U. S. Varidrive
1—Agitator drive

DRYERS
1—28″ diameter x 84″ face
2—30″ diameter x 40″ face with bearings
2—30″ diameter x 48″ face with bearings.
4—48″ dia. x 52″ face with frames, gears, bearings
1—36″ diameter x 44″ face
3—36″ diameter x 76″ face.
5—36″ diameter x 84″ face, anti friction bearings and gears.
1—16″ diameter x 54″ face (steel)
6—48″ diameter x 130″ face.
2—Cooling Drums, bronze 36″ x 128″, with frames, gears & necessary rolls to make up the unit. (After dryers)

EMBOSSING CALENDERS
1—43″ 3-Roll Embossing Calender.
1—62″ 2 roll Embosser.

EXTRACTOR ROLLS
1—Extractor roll, 26″ diameter x 104″ face
1—Rice Barton & Fales, Extractor Roll, 26″ diameter x 104″ face

FELT ROLLS
50—Brass Felt Rolls, with Brass Journals, 72″ face x 5″ dia.

FLAT SCREENS
1—8 Plate "Packer"
1—12 Plate "Packer"
1—16 Plate "Packer" late type roller shoes.

HOGS
2—Mitts Merrill Type 15 C.F.

JORDANS
1—Noble & Wood Mammoth
1—Noble & Wood Monarch, Type D.

FOR SALE

LABORATORY EQUIPMENT
1—Bauer-McNett Fibre Classifiner, monel tanks, complete with copper screen plates.
1—16″ diameter x 24″ face Laboratory High Pressure Dryer
1—Press Roll 6″ diameter 24″ Face, steam jacketted
1—2′ Shartle Hydrapulper
2—8″ x 8″ Valley Sheet dryers
1—12″ x 12″ Valley Sheet dryer
1—6″ diameter Hydraulic Press
1—25 lb. Valley Laboratory Beater, with washer.
1—Experimental Digester (High Pressure)
1—15 lb. E. D. Jones Beater
3—Jonsson Test Screens
1—Sutherland Refiner
1—Schopper-Riegler Freeness Tester.
1—8″ x 8″ Williams Sheet Mold
2—8″ x 8″ Valley Hydraulic Presses
1—Williams Smoothness and Formation Tester
1—6″ Mayer Coater, all rolls and pans bronze and steam heated. Used for brush, knife, reverse roll or dip coating, also waxing & plastic coating.
1—Clark Softness & Stiffness Tester
1—20″ Dilts Wet Machine
1—Williams Centrifuge

LAMINATING MACHINES
2—84″ Asphalt laminators.

MISCELLANEOUS
1—#1 Miami Selectrap

MOTORS
1—100 H.P. Westinghouse Motor, variable speed, 585 r.p.m.

PACKAGING MACHINE
1—Morpac Packaging Machine (Details on request).

PRESS ROLLS
2—Chilled iron, chrome plated 9″ x 72″
1—Chilled iron, chrome plated 12″ x 100″
1—Chilled iron, chrome plated 10″ x 74″
8—sets (1 rubber, 1 chrome steel) 74″ face x 15″ dia., complete with bearings.

PRESS SECTIONS
2—Complete Press Sections & frames, gears, bearings), 18″ diameter x 90″ face rolls (1 rubber, 1 bronze & 1 rubber Stonite. Also 2 extra brand new rubber covered rolls.

PULPERS
4—Dyno-Pulpers

PUMP
1—Morris-10,000 g.p.m. 25 ft. head (all bronze)

REELS
1—86″ 2 bowl reel.
1—84″ 3 bowl revolving reel.
1—100″ Rice Barton 2 bowl Reel, heavy duty.
1—123″ 3 bowl Revolving Reel
1—134″ 2 drum
1—72″ Downingtown Reel, 2 bowl.

REFINERS
1—Dilts Classifiner, practically new
1—Rice Barton Dynofiner, details on request.
1—Dilts. Hydrafiner, stainless steel filling, anti-friction bearings, excellent condition. including 125 h.p. motor
1—12″ Wiener Refiner, with 200 h.p. motor

REGULATORS
1—Bird Consistency Regulator
1—Trimbey Consistency Regulator

ROLLS
Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

ROTARY SCREENS
1—#1A Bird, copper vat.
2—APMEW Rotary Pulp Screens.

SAVEALLS
2—Savealls, cylinder molds, 42″ diameter x 106″ face, brand new vats.
1—LaMorte, 48″ diameter x 82″ face cylinder mold.

SCREEN PLATES
Bird Rotary screen plates.

SHEETER
1—132″ Hamblet heavy duty duplex sheeter, anti-friction bearings throughout, including lawbov and backstand.
1—84″ Hamblet, duplex, back stands.

SHREDDER
1—16″ "Swift" Paper Shredder

FOR SALE

SLITTERS & WINDERS
1—32″ Cameron Type 9
3—42″ Cameron Type 6
1—42″ Cameron Type 8
1—42″ Cameron Type 26-2A
3—50″ Cameron Type 6
1—52″ Cameron Type 9
1—62″ Cameron Type 6
1—62″ Cameron Type 8
1—72″ Cameron Type 9
1—84″ Cameron Type 12
1—86″ Two Drum Moore & White 50″ diameter rewind.
1—96″ 4 drum Moore & White winder
1—128″ Beloit Shear cut winder, drive and variable speed motor.
1—102″ Cameron Type 18, 60″ diameter
1—122″ Cameron Type 18, 60″, anti friction bearings
1—136″ Langston, 60″ diameter

SLITTING DEVICE
84″ Quick change slitting device shear cut, complete, practically new.

STEAM JOINTS
10—3″ Johnson steam joints (new).

STOCK PUMP
1—10 x 20 Shartle Triplex

STRAINER
1—Elliott Twin Strainer, Type R

SUCTION COUCH SHELL
1—Downingtown suction couch shell only, 127½″ face x 26″ diameter

SUCTION COUCH ROLL
1—Beloit, 36″ diameter x 246″ face, SKF bearings.

SUCTION FELT ROLLS
1—Gilbert & Nash 122″ face
1—Beloit Rubber Covered Suction Felt Roll 109 face x 20½″ diameter.

SUCTION PRESS SHELL
1—14″ diameter x 100″ drilled face, suction Press Shell only.

SUPER CALENDER STACK
1—9 Roll 56″

TABLE ROLLS
22—Rubber Covered 10″ diameter x 246″ face
30—4″ dia. x 130″ face (will cut to size)

THICKENERS
2—Iron End Vats with 36″ diameter x 84″ face Cylinder Molds and 20″ diameter couch rolls, including spare cylinder mold and spare couch roll, all anti friction bearing equipped.

TOILET WINDERS
2—72″ Hudson-Sharp (Surface type winder)

TRIMMER
1—84″ Seybold

VACUUM PUMPS
1—H-3 Nash Vacuum Pump
3—#1 Nash Hytor vacuum pumps
1—#7 Nash Hytor vacuum pump with 75 h.p. synchronous motor.
2—Connersville, 14 x 20
2—#3 Nash Hytor
1—#4 Nash, with motor
3—L-5 Nash Vacuum Pumps
1—L-6 Nash Vacuum Pump

VATS
2—Brand new Downingtown Iron End Vats, copper lined, for 42″ diameter x 112″ face cylinder molds. Will cut down to your size.
2—D. J. Murray Co. Vats, iron ends, for 42″ x 120″ cylinder molds, overflow and counterflow.

VIBRATING SCREENS
2—Hummer electric Vibrating Screens, stainless steel, new
1—Selectra 2 stage, 5 ft. x 10 ft.
1—36″ x 48″ Vibrating Screen

WEB GUIDE
1—110″ Stanford Constant Tension Unit, air operated.

YANKEE DRYERS
1—140″ face x 12′ dia., anti-friction bearings & stands.
1—84″ diameter x 56″ face.

Paddy Ross, Pres. **J. J. ROSS COMPANY** Ben Kurs, Treas.

377 Frelinghuysen Ave.* **Tel—Bigelow 3-3720** **Newark 12, N. J.**

Help Wanted

WANTED

Young recent graduate in science or engineering with a few years experience in pulp and paper manufacture for interesting job in New York City office. Replies treated in greatest confidence. Please write Box 58-267 Paper Trade Journal.

TF

Situations Wanted

YOUNG—WIDE FOURDRINIER SUPV. EXPERIENCED STOCK PREPARATION — DE-INKING AND COLOR MATCHING—BLEACHED SULPHITE SPECIALTIES. WANTS ADVANCEMENT TO HIGHER SUPERVISOR STATUS. ADDRESS BOX 58-315 CARE PAPER TRADE JOURNAL.

D-29

Engineer Available

M.E. with 34 years experience in pulp, paper and board mills as Chief Engineer, Plant and Project Engineer. Qualified to supervise mechanical and electrical maintenance departments. Power plant operation. Layout, design, construction and installation. Well versed in labor relations with proven ability to supervise personnel. Address Box 58-301 care Paper Trade Journal.

D-29

EXECUTIVE—Conversion of Boards and Papers. Currently Works Manager; desire change for challenging opportunity. Highly successful record in organization, production and development. Address Box 58-122 care Paper Trade Journal.

D-29

For Sale

FOR SALE
IMMEDIATE DELIVERY
LOCATED—PHILADELPHIA, PA.

1—90" Yankee Fourdrinier Machine. Equipped with Suction Press, Head Box, Voight Inlet.

1—6 Ft. Luken Steel Yankee Dryer—150# Test.

1—6 Ft. Moore & White Yankee Dryer.

The above two dryers are fully equipped with doctors, Honeywell speed indicators and air cylinders with Foxboro controls. All rolls (felt & wire) equipped with A.F. Bearings. Direct Motor Drives. Excellent Condition.

2—Collators.

1—#1 Claflin Refiner.

1—75 KW MG Set with Controls.

2—Embossers.

3—Beaters.

2—Savealls.

Many other items, including pumps, motors, laboratory equipment, etc.

Write—Wire—Phone For Your Needs

RUDERMAN MACHINERY EXCHANGE
GOUVERNEUR, NEW YORK
Telephone 333-334

TF

FOR SALE—One (1) Downingtown Suction Couch Roll, 18¼" O. D. x 168" Drilled face x 185" Center to Center of Stands. Condition as new. Address Box 58-327 care Paper Trade Journal.

D-22

For Sale

FOR SALE Lynch Morpac Wrapping Machine—Model E

Completely automatic. Will wrap packages 7½ x 5 x ¾ to 15 x 10 x 5 at high speed. Printing attachment included. This machine in perfect condition—Priced for quick sale.

General Offset Printing Co., Inc.
157 Chestnut Street — Springfield, Mass.

D-29

CONTAINERS

Glass, metal or steel. Up to 5-gal. capy. for sample, laboratory and production use. Prompt shipment from complete stocks of quality containers, at moderate costs. M. Simcovitz & Co., 228 Ferry St., Springfield 4, Mass.

D-22

FOR SALE

158' Jeffrey Paper Roll Conveyor w/2-15 HP A.C. motors
54" Hamblett 2 knife sheeter w/layboy 44", 50", 65" Seybold cutters

Apex Printing Machinery Co. Inc.
210 Elizabeth St.
New York 12, N. Y. — WOrth 6-0070

D-22

COATING RODS FOR SALE

Equalizers, Mayer Rods, Metering Rods. Wire sizes #3 (.003) to #50 (.050). Music spring wire and stainless steel wire.

DeNeve & Consler Co.
8 Boston St. Phone HA 6-4364 Rochester 21, N.Y.

D-26

Wanted

WANTED

Squeeze Roll Waxing Machine. Potdevin or other manufacture — 60" or wider.
Address Box 58-326 care Paper Trade Journal.

D-22

WANTED—Breaker Beater Roll, 48" face, 72" diameter, overall length approx. 11 ft. Address Box 58-304 care Paper Trade Journal.

D-22

Sales Representation

SALES REPRESENTATION AVAILABLE FOR MANUFACTURERS TO PAPER MILLS AND CONVERTERS

Middle Atlantic & New England
35-B.S.Ch.E.

Past 10 years in Top Level Sales to and for Paper Mills

Interested in tough sales assignment which will utilize my training and experience in this field. Prefer incentive basis. Accustomed to heavy travel. Familiar with chemicals, adhesives, board (folding carton), fine papers (printing & technical), machinery . . . imagination necessary for creative selling. Are you interested in increasing your sales?

Reply Box 58-324 care Paper Trade Journal.

D-22

BARGAINS

IMMEDIATE DELIVERY

1—128" B & S 10-Roll Calender Stack. King Roll 24" Dia. Heavy box frames, full set of doctors. Excellent Condition.
1—86" Farrel 8-Roll Calender Stack. Antifriction Bearings. Excellent Condition.
26—36" x 72" Complete Dryer Section, Stack, Drives, Etc.
10—48" x 150" Pusey & Jones Dryers.
1—84" Kamyr Machine, Complete. 75 ton per day output.
1—E. D. Jones Majestic Jordon No. A-482. New S.S. Fillings. Like New.
1—E. D. Jones Imperial Jordon, S.S. Fillings
1—Noble & Wood Mammoth Jr. Jordon, S.S. Fillings
1—Monarch Jordon, Model SP, Serial #21095, no fillings. Direct connected to a 75 H.P. G.E. 400 RPM Motor.
1—No. 3 Jones Pulpmaster, Late Type. Complete Drive.
1—No. 1 Jones Refiner. Direct connected to 100 H.P. d.p. B. B. 440 Volt Motor.
1—A.P.P. Rotary Centrifugal Pulp Screen, 40" Dia. x 42" Face. Serial #1274227. Like new. Capable of 40 ton groundwood pulp per day.
1—Trimbey Senior Rotary Screen.
2—Impco Rotary Pulp Screens.
3—No. 3 Impco Rotary Knotter Screens. S.S. Plates.
1—110" Pusey & Jones 2-Drum Winder. A.F. Bearings.
1—Hudson Sharpe Toilet Tissue Converting Machine. Ser. #2123. 8 Spare Mandrel Bars.
1—42" Dia. x 110" Face Pope Type Reel. Excellent Condition.
1—25" Dia. x 156" Face Sandusky Suction Couch, Bearings & Stands.
1—22" Dia. x 138" Perforated Face Sandusky Suction Couch, Bearings & Stands.
1—10-Knife Carthage Chipper with Antifriction Bearings.
1—54" Dia. x 48" Face Valley Iron Tub Beater.
1—Dilts 53" Dia. x 60" Face—2000 lb. Iron Tub Beater. S.S. Extractor Type Hood.
1—Seybold Knife Grinder. Size G, 84" Table. Serial #4X802.
1—Sandy Hill Sulphur Burner. Complete.
2—#2 Bird Screens with Copper Vats & S.S. Plates.
—Tugboat Annie Pulper.
1—Worthington Air Compressor, Model STR2. 2-Stage, Air Cooled. 5 H.P.
1—C.P. 12 x 10 Air Compressor, 100# Pressure.
1—I.R. 7 x 7 Air Compressor. 100# Pressure.
1—No. 244 Mattison 18" Core Cutting Saw —5 H.P. 3450 RPM, 3/60/220-440 volt.
1—90 H.P. Terry Turbine, Type G-4000/1000 RPM. For Paper Machine Drive. Complete.
1—No. 2 Jones Pulper. A.F. Bearings. Spare Worm.
1—36" Putman H.D. Lathe—15' Centers.
1—24" x 6' L & S Geared Head, H.D. Machine Lathe. Taper Attachment, Hollow Spindle, Motorized.
1—350 H.P. G.E. 2200 Volt, 450 RPM Motor with G.E. 350 H.P. 2200 Volt, Type CR7065-M5 Controller.
1—A.C. 75 H.P. 3/60/220-440 Volt, 720 RPM. T.E.F.C. Type ARZX Motor.
1—A.C. 60 H.P. 3/60/220-440 Volt, 720 RPM. T.E.F.C. Type ARZX Motor.
1—G.E. 100 H.P. MG Set, 250 Volt D.C.
1—250 H.P. Ingersoll Rand Diesel Engine Generator Set—G.E. Generator, 150 KW, 480 Volts, 720 RPM.

Save over 50% on your requirements for New Jordon Fillings. S.S., Bronze & Carbon Steel.

Gear Reducers, P.I.V. Drives, Generators, B.B. Pumps, Stock Pumps, Plunger Pumps, Etc.

1000 Electric Motors from ¼ H.P. to 600 H.P. In Stock.

The above is but a small part of the inventory we carry. We can furnish you with almost anything in the line of paper mill, electrical and machine shop equipment.

Write—Wire—Phone For Your Needs

RUDERMAN MACHINERY EXCHANGE
GOUVERNEUR, NEW YORK
Telephone 333-334

TF

PRACTICAL PAPER TECHNOLOGY

by William Bond Wheelwright

This book begins with a survey of "Progress in the Paper Industry" and ends with a list of books recommended for collateral reading. The intermediate chapters are entitled: "How to Judge Paper"; "Physical Aspects of Paper"; "Practical Manual and Visual Tests"; "Essential Facts About Papermaking"; "Coated, Glazed and Specialty Papers"; "Permanence of Paper"; "Paper Difficulties in Converting"; "Paper as a Medium for Printing"; "Letterpress Printing"; "Offset Lithography"; "Intaglio Processes."

Also a Supplement containing a Quiz Test on paper.

Practical Paper Technology. Price $1.75

Foreign Delivery—25c extra

Remittance with order

Lockwood Trade Journal Co., Inc.

49 WEST 45th ST. NEW YORK 36, N. Y.

Kalamazoo

WOOD TANKS

Built from best tank grade lumber. Backed by over 90 years' tank building experience. *Kalamazoo* can give you what you want. Free estimates and suggestions. Write today.

WOOD TANK DIVISION

Kalamazoo TANK and SILO COMPANY

858 HARRISON STREET, KALAMAZOO, MICH.

Another Plant To Serve You

SHIP US IN KALAMAZOO

PACKING PLANTS

CHICAGO, ILL.
WASHINGTON, D. C.
CAMDEN, N. J.
KALAMAZOO, MICH.
LOUISVILLE, KY.

THOMAS PAPER STOCK CO.

1500 N. Hooker St. MO-4-5700 Chicago 22, Ill.

KEEP UP WITH TECHNICAL ADVANCES IN YOUR FIELD . . . BY READING THESE NEW BOOKS!

MODERN PULP AND PAPER MAKING

Revised and enlarged 3rd Edition, edited by John B. Calkin, Consultant to the Pulp, Paper and Chemical Process Industries.

Describes and discusses all principles and practices involved in modern pulp and paper making. 558 pages. Sturdy cloth binding. $10.

PULP AND PAPER MILL INSTRUMENTATION

By E. J. Cole and M. Todd. Appendix by R. B. Lundy.

The first book ever published devoted solely to this subject, covers automatic control and measurement, and application of instruments to pulp and paper processes. 117 pages. Clothbound. $3.50.

PULP, PAPER AND BOARD MILL MAINTENANCE

Edited by John C. W. Evans

Presents complete procedures for plant maintenance on all paper and pulping operations. Well illustrated, many charts, tables and graphs are included. 126 pages. $2.50.

HANDBOOK OF ENGINEERING MATERIALS

Edited by D. F. Miner, Carnegie Institute of Technology and J. B. Seastone, Olin Mathieson Chemical Corporation.

This convenient handbook enables you to draw upon a staff of 52 specialists for any data you may need in selecting materials for any purpose in any field of engineering. 1382 pages, Illustrated, Flexible plastic binding, $17.50.

LOCKWOOD TRADE JOURNAL CO., INC.

49 West 45th Street, New York 36, N. Y.

YES, by return mail (postpaid), send me a copy of each book I have checked below.

Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....

☐ MODERN PULP AND PAPER MAKING $10.00

☐ PULP AND PAPER MILL INSTRUMENTATION.. $ 3.50

☐ PULP, PAPER AND BOARD MILL MAINTENANCE ..... $ 2.50

☐ HANDBOOK OF ENGINEERING MATERIALS... $17.50

ADVERTISERS

Adamson Engrg. Corp. ..... —
Adell Chemical Co. ..... —
Albany Felt Co. ..... —
Allied Chemical Corp. Nitrogen Div. ..... —
Allis-Chalmers Mfg. Co. ..... —
Aluminum Co. of America ... —
American Bitumuls & Asphalt Co. ..... —
American Bridge Div., U. S. Steel Corp. ..... —
American Cyanimid Co., Paper Chemical Dept. ..... —
American Cyanamid Co., Dyes Dept. ..... —
American Cyanamid Co., Organic Chem. Div. ..... —
American Cyanamid Co., Pigments Dept. ..... —
American Paper & Pulp Co. Inc. ..... —
American Potash & Chem. Corp. ..... —
American Steel & Wire Co. .. —
Ames Company ..... —
Anglo Paper Products Ltd. .. —
Annin Company ..... —
Antara Chemicals, Sales Div. Gen. Aniline & Film Corp. .. —
Apmew, Inc. ..... —
Appleton Machine Co., The ... —
Appleton Wire Works ..... —
Appleton Wood Products Co. . —
Armco Drainage & Metal Products ..... —
Armco Steel Corp. ..... —
Armstrong Machine Works .. —
Arnold Hoffman & Co. ..... —
Asten-Hill Mfg. Co. ..... —

Babcock & Wilcox Co. ..... —
Bahr Brothers Mfg. Co. ..... —
Bailey Meter Co. ..... —
Bauer Bros. Co. ..... —
Becco Chem. Div., Food Mchy. Corp. ..... —
Beloit Iron Works Co. ..... —
Bird Machine Co. 13
Bixby, R. W., Inc. ..... —
Black-Clawson Co. 47
Blaw-Knox Company ..... —
Bolton & Sons ..... —
Borden Co. ..... —
Bowsher Co., N. P. ..... —
Brandon Sales, Inc. ..... —
Broughton, A. E. & Co. 25
Brown Company ..... —
Buckeye Cellulose Corp. ..... —
Buffalo Forge Co. ..... —
Buffalo Pumps, Inc. ..... —

Cady, E. J., & Co. ..... —
Calgon Company .... Back Cover
Cambridge Instrument Co. .... —
Cameron Machine Co. ..... —
Capitol Products Corp., Read Standard Div. ..... —
Carthage Machine Co. ..... —
Central National Corp. ..... —
Central Soya Co, Chemurgy Div. ..... —
Chicago Bridge & Iron Co. .. —
Ciba Company ..... —
Cities Service Oil Co. ..... —
Clark-Aiken Company ..... —
Classified Advertising 52
Clearing House 52
Cleveland Crane & Engrg. Co.. —
Colonial Plastics Mfg. Co. .... —
Columbia-Geneva Steel Div., U. S. Steel Corp. ..... 30 & 31
Columbia-Southern Chem. Corp. Sub of Pittsburgh Plate Glass Co. ..... —
Combustion Engrg. Co. 36
Corn Products Sales Co. 29
Crane Co. ..... —

Davis, Frank H., Co., Inc. ... —
DeZurick Corporation ..... —
Dewey & Almy Chem. Co. ..... —
Diamond Alkali Co. ..... —
Dicalite Div., Great Lakes Carbon Corp. ..... —
Dierks Paper Co. ..... —
Dilts Machine Works 47
Dodge Mfg. Co. ..... —
Dorr-Oliver ..... —
Dow Chemical Co. ..... —
Dowell, Inc. ..... —
Draper Bros. Co. ..... —
Dryden Paper Co., Ltd. .... —
du Pont, E. I., de Nemours & Co., Dyestuffs Dept. ..... —
du Pont, E. I., de Nemours & Co., Electrochemical Dept. .. —
du Pont, E. I., de Nemours & Co., Grasselli Dept. ..... —

Eaton Manufacturing Co. Cover 3
Ebasco Services, Inc. ..... —
Egan Frank W., & Co. ..... —
Elixman Paper Core Co. ..... —
Elliott Company ..... —
English China Clays Sales Corp. ..... —

FabriValve Company ..... —
Fairbanks Morse & Co. ..... —
Falk Corporation ..... —
Farrel-Birmingham Co., Inc... —
Fibrecast Company ..... —
Fife Manufacturing Co. ..... —
Fitchburg Screen Plate Co. .... —
Foxboro Co. ..... —
Fraser Companies, Ltd ..... —
Frederick Iron & Steel Co. ... —
Freeport Sulphur Co. ..... —

Garlock Packing Co. ..... —
Gaspesia Sulphite Co, Ltd. .. —
Gates Rubber Company ..... —
Geigy Chemicals Corp., Geigy Dyestuffs Div. ..... —
General Dyestuffs Co. ..... —
General Electric Co. ..... —
General Tire & Rubber Co. .. —
Gibbs-Brower Co. 52
Gilbert & Nash Co. ..... —
Glidden Company 3
Goodrich Industrial Prod. Co. . —
Gottesman & Co. ..... —
Grace, W. R., & Co., Dewey & Almy Chem. Div. ..... —
Graton & Knight Co. ..... —
Graver Tank & Mfg. Co. .... —
Grinnell Co., The ..... —
Gruendler Crusher & Pulv. Co. —
Gulf Oil Corporation ..... —
Gurley W. & L. E. ..... —

Hagan Chemicals & Controls Corp. ..... —
Hamblet Machine Co. ..... —
Harbison-Walker Refractories . —
Hendrick Mfg. Co. ..... —
Hercules Powder Co. ..... —
Hills-McCanna Co. ..... —
Hooker Electrochemical Co. .. —
Huber, J. M. Corp. ..... —
Hudson Sharp Machine Co. .. —
Hungerford & Terry, Inc. ... 51
Huyck, F. C. & Sons ..... —

Improved Machinery, Inc. .... —
International Business Machines ..... —
International Paper Co. ..... —

Jenkins Brothers ..... —
Johns-Manville Corp. ..... —
Johnson Corp., The 51
Johnson, Alvin H., & Co. ... 49
Jones, E. D., Corp. ..... —
Jones & Laughlin Steel Corp. —

Kalamazoo Tank & Silo Co. .. 55
Kidder Press Co. ..... —
Knox Woolen Co. ..... —
Koppers Company ..... —

Langston, Samuel M., Co. .. —
Link Belt Co. ..... —
Lockport Felt Co. ..... —
Lockwood Greene Engineers .. 50
Lodding Engineering Co. .... —
L. O. F. Glass Fibers Co. ..... —
Lukon, Inc. ..... —
Lunkenheimer Co. ..... —
Lyddon & Co. ..... —

Magnus Metal Corp. ..... —
Main, Charles T., Inc. 50
Manchester Machine Co. ..... —
Marathon—A division of American Can ..... —
Marathon Electric Mfg. Corp. —
Mead Pulp Sales, Inc. ..... —
Meincke, A. M. & Son ..... —
Merrick Scale Co. ..... —
Mixing Equipment Co. ..... —
Montague Machine Co. ..... —
Moore & White Co. ..... —
Morden Machines Co. ..... —
Mt. Vernon Mills Inc. ..... —
Murray, D. J., Mfg. Co. ..... —

Nash Engineering Co. 45
National Lead Co., Magnus Metal Div. ..... —
National Starch Products, Inc. ..... —
National Tube Div., U. S. Steel Corp. ..... 30 & 31
New Jersey Zinc Co. ..... —
Nichols Eng. & Research Corp. ..... —
Noble & Wood Mch. Co. .... —
Nopco Chemical Co. ..... —
Northeastern Paper Sales ..... —
Norton Co. ..... —

Oakite Products Inc. ..... —
Ohio Injector Co. ..... —
Olin Mathieson Chem. Corp. .. —
Osborne Paper Mill Equip. Corp. ..... —

Paper Converting Machine Co. .. —
Parsons & Whittemore ..... —
Patton Mfg. Co. ..... —
Perkins, B. F., & Sons, Inc. .. —
Perkins Goodwin Co. ..... —
Personnel Service Associates .. 52
Pioneer Paper Stock Co. 49
Pittsburgh Piping & Equip. .. —
Poirier Control Co. ..... —
Potdevin Machine Co. ..... —
Powell Valves ..... —
Price & Pierce, Ltd. ..... —

Railway Supply & Mfg. Co. ... —
Raymond, Chas. P. Service Inc. ..... —
Read Standard Div. of Capitol Products Corp. ..... —
Ready Power Co. ..... —
Record Fdy. & Mch. Co. .... —
Red Ray Mfg. Co. ..... —
Rice Barton Corp. 8
Riedel, Gus & Son ..... —
Riegel Paper Corp. ..... —
Rohm & Haas Co. 35
Ronningen-Petter Co. ..... —
Roosevelt Paper Co. Front Cover
Roots-Connersville Blower Div. Dresser Industries ..... —
Ross, J. J., Co. 53
Ross-Midwest Fulton Co. .... —
Ross Paper Machinery Co. .. —
Ruderman Mach. Exchange .. 54
Rust Engineering Co. 50
Ryerson, Jos. T., & Son ..... —

Sandoz, Inc. ..... —
Sandy Hill Iron & Brass Works ..... —
Scapa Dyers Inc. ..... —
Seaboard Air Line R. R. Co. . Shartle Div., Black-Clawson Co. 47
Shawinigan Resins Corp. ..... —
Sheffield Corp. ..... —
Shell Chemical Corp. ..... —
Shuler & Benninghofen ..... —
Shy, C. D., & Company 50
Signode Steel Strapping Co. .. —
Simplex Wire & Cable Co. ... —
Sinclair Company 51
Sirrine, J. E., Co. ..... —
Smidth, F. L., & Co. 2
Soderhamn Mch. Mfg. Co. ... —
Sonoco Products Co. ..... —
Southworth Machine Co. .... —
Spraying Systems Co. ..... —
Sprout Waldron & Co. ..... —
Stadler Hurter & Co. ..... —
Staley Mfg. Company ..... —
Stanley Steel Strapping ..... —
Stebbins Engrg., Co. ..... —
Stein, Hall & Co. ..... —
Stone & Webster Engrg. Corp. —
Stowe-Woodward, Inc. 6
St. Regis Paper Co. ..... —
Sunday, Geo. M., Assoc. 52
Swenson Evaporator Co. ..... —

Taylor Instrument Co.'s ..... —
Taylor Stiles & Co. ..... —
Tennessee Coal & Iron Co. 30 & 31
Tennessee Corp. ..... —
Testing Machines ..... —
Texas Co. 4
Texas Gulf Sulphur Co. ..... —
Thiele Kaolin Co. ..... —
Thomas Paper Stock Co. 55
Thurso Pulp & Paper Co. .... —
Titanium Pigment Corp. .... —
Toledo Scale Corp. ..... —
Torrington Co. ..... —
Towmotor Corp. ..... —
Trent Tube Co. ..... —
Turner Halsey Co. ..... —

United Carbon Co. Inc. ..... —
United Engrg. & Fdy. Co. .... —
United Paper Mchy. Corp. .. —
U. S. Industrial Chem. Co. .. Div. of National Distillers & Chem. Corp. ..... —
U. S. Rubber Company ..... —
United States Steel Export 30 & 31
United States Steel Supply Co. ..... 30 & 31
U. S. Steel Corp. ..... 30 & 31

Valley Iron Works ..... —
Vanderbilt, R. T., Co. ..... —
Virginia Smelting Co. ..... —

Waldron, John Corp. ..... —
Walworth Co. ..... —
Weber, H. G., Company ..... —
West End Chemical Div. Stauffer Chem. Co. ..... —
Westvaco Chlor-Alkali Div., Food Mchy. & Chem. Corp. ..... —
West Virginia Pulp & Paper Co. 51
Weyerhauser Timber Co. .... —
Whiting Corp. ..... —
Williams Apparatus Co. ..... —
Williams-Gray Co. ..... —
Wisconsin Wire Works ..... —
Wyandotte Chem. Corp. ..... —
Wyatt Metal & Boiler Works . —

Yale & Towne Mfg. Co. ..... —
Yarnall-Waring Co. ..... —

While we strive for accuracy in preparing the above index which is purely a service to our readers, we cannot be responsible for errors.

PAPER TRADE JOURNAL BUSINESS STAFF

New York 36, N. Y. 49 W. 45th St. Plaza 7-2370

Arthur E. Gordon, Business Mgr.

Frederick B. Grosse, Production Mgr.

Francis J. Gordon — Alrick Man

CHICAGO 3 ILL.: H. K. Vinton
Room 1020, 79 W. Monroe St. CEntral 6-2784

PITTSBURGH 11 PA.: H. L. Poulton
610 Pennridge Road. HEmlock 1-1571

MIAMI, FLA.: Hal Moore
279 N. E. 79th Street

Rep. by McDonald-Thompson Co. in:

LOS ANGELES 5, CAL.: R. Teeter
3727 W. Sixth St., DUnkirk 7-5391

SAN FRANCISCO, CAL.: Cal Wood
625 Market St. YUkon 6-0647

DENVER 2, COLO.: Bob Heidersbach
222 Colorado Nat'l Bank Bldg. KEystone 4-4669

TULSA 4, OKLA.: T. R. Trautmann
2010 S. Utica. Riverside 3-1981

PORTLAND 4, ORE.: Fred Goetz
404 Times Bldg. CA 2-5146

HOUSTON 6, TEXAS: F. Vickrey
Room 214, 3217 Montrose Blvd. JAckson 9-6711

SEATTLE 4, WASH.: H. Abney
1008 Western Ave. MA 3-3766

Foreign Representatives

GERMANY: Herbert Morgenbesser
Konigarren 3, Hamburg—F. U. Phone: 59-82-03

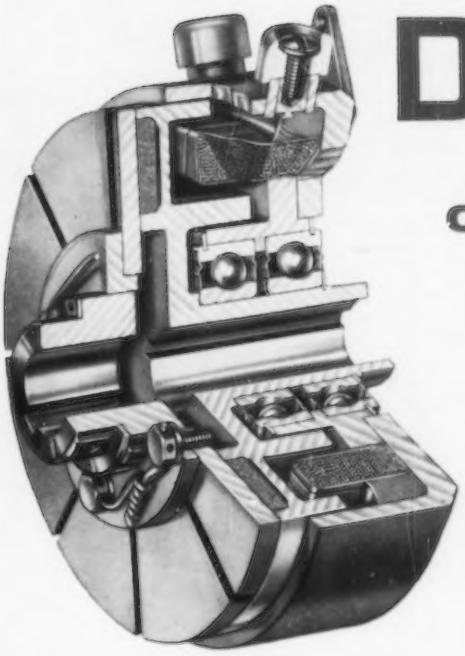
UNITED KINGDOM: H. R. Vaughan
Publishing & Distributing Co., Ltd.
177 Regent St., London W 1, England **Regent 6534**

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.

New—Small Sizes!

EATON DYNA-TORQ

MAGNETIC-FRICTION CLUTCHES and BRAKES



STATIONARY-FIELD, BEARING-MOUNTED DYNA-TORQ CLUTCH

Now Available in a Full Line from 1¾" to 15" Diameter

Eaton Dyna-torQ Magnetic-Friction Clutches and Brakes provide a simple, accurate, responsive method of controlling power and motion in today's complex production and processing machines.

The new smaller sizes and new design types of Dyna-torQ Stationary-Field Clutches and Brakes enable Eaton to offer a well rounded line, including flange-mounted and bearing-mounted clutches, and replaceable-face brakes. Unique features of design and construction result in worthwhile maintenance cost savings. Dyna-torQ units, easily and quickly installed on new machines or existing plant equipment, deliver many highly desirable advantages.

Dyna-torQ Magnetic-Friction Equipment Offers these Important Advantages:

- ★ Accurate power control
- ★ Dependable motion control
- ★ Rapid response
- ★ Easy "built-in" installation
- ★ Low maintenance costs
- ★ Compact plug-in type controls—may be remotely mounted
- ★ Inter-changeability of parts

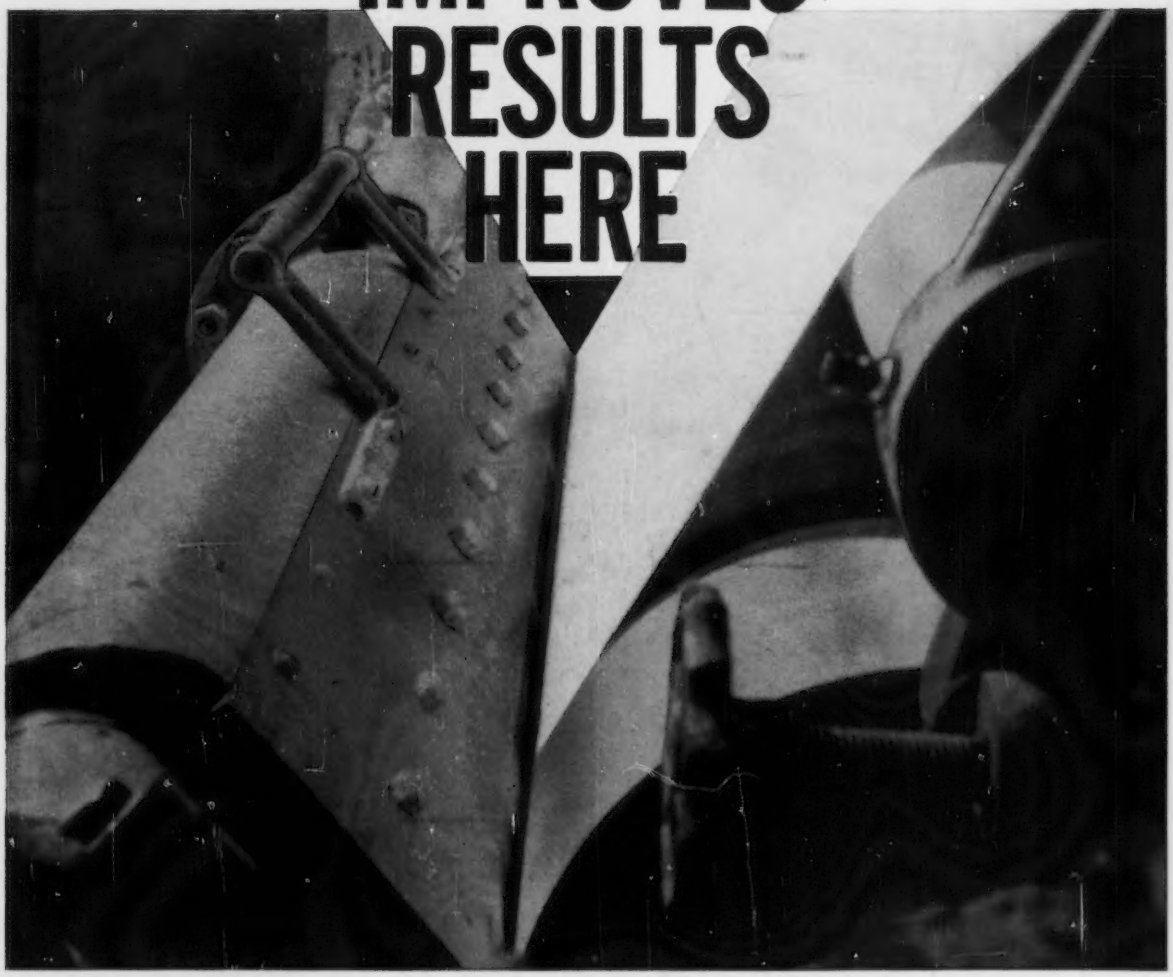
Send for this new illustrated bulletin giving complete description and specifications covering Dyna-torQ Stationary-Field Clutches and Replaceable-Face Brakes.

Dyna-torQ Equipment is Available through Dynamatic Distributors in all Leading Cities

EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

CALGON*
IN COATING FORMULAS IMPROVES RESULTS HERE



Calgon improves coating formulas in several important ways. Its high efficiency as a dispersing agent of clay, titanium dioxide, precipitated calcium dioxide and other pigments results in smoother coating colors. Flow properties are improved, and higher concentrations of solids may be used. Calgon also improves the bond between coating and the paper stock.

These are some of the reasons why most of the nation's leading producers of coated papers and coated boxboards use Calgon. They also call on Calgon's Technical Service for assistance on a wide variety of water problems.

If you have a problem, call on Calgon for assistance. A technical bulletin, "Calgon and Its Applications in the Pulp and Paper Industry" is available on request.

*Calgon is the registered trade mark of Calgon Company for its sodium phosphate glass (sodium hexametaphosphate) products.

CALGON COMPANY

DIVISION OF **HAGAN** CHEMICALS & CONTROLS, INC.
HAGAN BUILDING, PITTSBURGH 30, PENNSYLVANIA
DIVISIONS: CALGON COMPANY, HALL LABORATORIES
IN CANADA: HAGAN CORPORATION (CANADA) LIMITED, TORONTO